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**CHISON 8300 VET**

**Veterinary Ultrasound System**

# **OPERATION      MANUAL**

**CHISON MEDICAL IMAGING CO., LTD.**

**ADD: NO.8, XIANG NAN ROAD, SHUO FANG, NEW DISTRICT, WUXI, CHINA    214142**

**TEL: 0086-510-85311707, 85310593**

**FAX: 0086-510-85310726**

**EMAIL: SERVICE@CHISON.COM.CN**

**HTTP://WWW.CHISON.COM.CN**

**(We reserve the right to make changes to the user manual.)**

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## **Electromagnetic Compatibility(EMC)**

# Chapter 1      General Description

## 1.1 Product introduction

- CHISON 8300VET is a portable digital B/W veterinary ultrasound system which adopts the fully digital beam-former technology. The digital design has greatly improved the image quality and will greatly improve your diagnosis accuracy and confidence. The software of the system can be upgraded.
- CHISON 8300VET can be applied in ultrasound diagnostic examinations of abdomen, obstetric, gynecology, reproduction, small parts and cardiology etc.
- The system has maximum 2 probe connectors, which can use convex, linear, micro-convex, linear rectal probe etc. Each probe is wide-band probe, and allows 4-step multi-frequency adjustment, so it can tailor to different body-sized animals.
- Many types of periphery devices can be used with the system, such as video printer, USB memory disk etc.
- It has user-friendly design of the control panel and comprehensive software packages. With the multi-functional knob and menu on the screen, it's very easy to operate even there're many functions in the system.
- It is a versatile portable ultrasound imaging system with excellent performance and compact design. It has modern outlook, back-lit soft-key keyboard and user-friendly interface, which makes your operation convenient and pleasant.

## 1.2 Main function

1. Display mode: B, B/B, 4B, B/M, M. In the M or B/M mode, 4 step sweep speeds are provided for selection.
2. Multi-step display magnification, depth enhancement.
3. Total gain, brightness and contrast; wideband frequency conversion; 6 segments of STC slides for selection and adjustment.
4. Strong image post-processing function, 10 kinds of IP parameters combination for selection.
5. Clear and stable image with high resolution by adopting techniques as multistep transmitting focusing, continuously dynamic receiving focusing, continuously dynamic aperture control, continuously dynamic frequency scanning, large dynamic wide-band low noise preamplifiers, logarithmic compression, STC control, dynamic filtering, edge enhancement, frame averaging, 256-level gray scale image display etc.
6. The C60613S probe has harmonic imaging function, it can turn on or turn off the Harmonic function by pressing "CTRL+H" key.
7. Image freezing and storage function, the system can store around 1000 images Max. permanently in the system. By connecting USB memory disk to the system, massive storage of images can be made; Images stored in USB memory disk can be recalled for analysis.
8. 256 frames of real-time images can be stored in Cine-memory.

9. Probe scanning direction can be changed and image can be reversed in left/right, up/down direction.
10. Measurements as distance, area, circumference, volume etc. are available; and automatic calculation of OB and reproduction are available, direct display of GA-gestation age for Bovine, Equine, Ovine, Canine and Feline.
11. Ellipse and trace methods are available for area/circumference measurement.
12. Display of 16 kinds of body marks together with corresponding probe position indication.
13. Biopsy function.
14. Annotation function in image area of the screen, special annotation terms for different exam-mode can be added according to user's need.
15. Display of Patient ID No., time and date according to real-time clock.
16. Trackball available for operation and measurement. Characters can be input directly from keyboard.
17. When one function is under operating, the corresponding key on the keyboard will be brightly lit. When exiting from the function, the corresponding key on the keyboard will be slightly lit.
18. Standard PAL video frequency signal and VGA signal output.

### 1.3 Technical specifications

#### 1.3.1 Scanning mode:

Electronic convex  
Electronic linear  
Electronic micro-convex  
Electronic linear rectal

#### 1.3.2 Display mode:

B mode  
B/B mode  
4B mode  
B/M mode  
M mode

#### 1.3.3 Probe connector: 2 (Max.)

#### 1.3.4 Probe type:

Micro-convex probe C20615S : main frequency 5.0MHz, abdomen probe, OB/GYN probe (for small animal); Standard configuration  
Convex probe C60613S: main frequency 3.5MHz, abdomen probe, OB/GYN probe (for large animal); User option  
Linear rectal probe L74615S: main frequency 5.0MHz, reproduction probe (for large animal); User option  
Linear probe L40617S: main frequency 7.5MHz, superficial probe; User option

## 1.4 Main features

### 1.4.1 Acoustic power

12-step adjustable acoustic power

### 1.4.2 Transmission Focusing

Multiple-step transmission focuses with maximum 4 focus points can be selected simultaneously.

### 1.4.3 B mode display

Two display status: real-time or frozen

Image vertical / horizontal reversing

### 1.4.4 Display depth:

Electronic micro-convex (C20615S): 0-12.3cm, 8 steps adjustable

Electronic convex (C60613S): 0-24.6cm, 16 steps adjustable

Electronic linear rectal (L74615S): 0-11.1cm, 7 steps adjustable

Electronic linear (L40617S): 0-11.1cm, 7 steps adjustable

### 1.4.5 M mode

Sweep speed: 4 steps, 1cm/s, 2cm/s, 3cm/s, 4cm/s

### 1.4.6 Preset exam-mode

Five type: abdomen, OB/GYN, reproduction, small parts, user-defined

### 1.4.7 Gray scale :256 levels gray scale display

### 1.4.8 Image processing

Pre-processing: dynamic range transformation, edge enhancement, smoothness, frame averaging;

Post-processing: gray scale rejection, gray scale transformation,  $\gamma$  correction;

10 kinds of IP parameters combination selectable

### 1.4.9 Gain adjustment

Total gain adjustment

6-segment STC adjustable

### 1.4.10 Cine-memory

256-frame Cine-memory, automatic playback/ manual bi-directional playback

### 1.4.11 Measurement and calculation

1. B mode normal measurement:

Distance, circumference, area, volume, ratio, % stenosis, angle, profile, histogram

2. M mode normal measurement:

Distance, time, velocity, heart rate

3. Obstetric and reproduction calculation and measurement:

Gestation age (GA)

4. Cardiac calculation and measurement:

Left ventricular function

### 1.4.12 Memory function

Screen file can be saved.

USB ports available for easily copying files.

### 1.4.13 Video outlet

Video frequency signal outlet and VGA outlet.

### 1.4.14 Monitor

10-inch SVGA high resolution monitor



**1.4.15 Standard configuration**

1. Main unit
2. C20615S 5.0MHz micro-convex wide-band frequency conversion probe

Table 1-1 Probe type

Probe Name	Frequency	Application
C20615S	3.5/5.0/6.0/8.0 MHz	Abdomen,OB/GYN (small animal)
L74615S	3.5/5.0/6.0/7.5 MHz	Reproduction (large animal)
C60613S	2.5/3.5/4.0/5.0 MHz	Abdomen,OB/GYN (large animal)
L40617S	5.0/6.0/7.5/10.0 MHz	Small parts

**3 Relative accessories**

Table 1-2 Optional accessories

Part Name	Model	Application
Video printer	SONY or Mitsubishi video printer	Print video image
Trolley	TR-8000	To place 8300VET and its accessories

**1.5 Operating conditions****1.5.1 Environmental conditions:**

- Ambient temperature: 5°C ~ 40°C
- Relative humidity: 30% ~ 80%, no condensation
- Atmospheric pressure: 86kPa ~ 106kPa

**1.5.2 Power requirement:**

It can be AC 230V or AC 110V, customers should check first which type of voltage is required for the unit according to the label at the rear panel of the main unit.

1) If the label shows AC 230V, 50Hz, it means the power supply can be AC 230V  $\pm$  10%, 50Hz  $\pm$  1Hz, customers should check the AC available and make sure it's the same as required, then customers can insert the power plug into a fixed power socket with protective grounding. Any connector or plugboard (e.g. three phase-two phase plugboard) is not allowed to use.

2) If the label shows AC 110V, 60Hz, it means the power supply can be AC 110V  $\pm$  10%, 60Hz  $\pm$  1Hz, customers should check the AC available and make sure it's the same as required, then customers can insert the power plug into a fixed power socket with protective grounding. Any connector or plugboard (e.g. three phase-two phase plugboard) is not allowed to use.



**Note:** The system should be placed in a well-ventilated and dry place and kept away from strong electromagnetic interference, poisonous and corrosive gas. Direct sunlight and raining should be avoided.



**Caution:** PLEASE DON' T CONNECT the plug to AC 230V power supply if the label of machine indicates as AC 110V. Otherwise it will damage the main unit, and will also cause danger to operator!

**1.5.3 Fuse requirements:**

It should base on different power specifications:

If power input is AC 230V, Fuse specification is 250V, 2.0 A (time-lag), the model is 50T T2AL 250V

If power input is AC 110V, Fuse specification is 250V, 4.0 A (time-lag), the model is 50T T4AL 250V



**Caution:** WHEN NECESSARY, PLEASE USE THE BACK-UP FUSES PROVIDED WITH THE MAIN UNIT, OTHER TYPES ARE NOT SUGGESTED.

## Chapter 2 Safety Precautions

### 2.1 Safety classification

#### 2.1.1 According to the type of anti -electric shock: CLASS I EQUIPMENT



CLASS I EQUIPMENT means that it not only has the basic insulation function, but also has the protection device for anti-electric shock. Please refer to symbol on the left.

#### 2.1.2 According to the level of anti- electric shock: TYPE-BF EQUIPMENT



TYPE-BF EQUIPMENT means that it is the TYPE B equipment with Type F applied parts (connecting different kinds of hanging probe). Please refer to symbol on the left.

#### 2.1.3 According to the level of protection against harmful ingress of water:

The IP Classification of transducer probes is IPX7.

#### 2.1.4 According to the safety level when used in the presence of FLAMMABLE ANAESTHETIC MIXED WITH AIR (or WITH OXYGEN or WITH NITROUS OXIDE):

The Equipment is not suitable for use in the environment with **FLAMMABLE ANAESTHETIC MIXED WITH AIR (or WITH OXYGEN or WITH NITROUS OXIDE)**

#### 2.1.5 According to the mode of operation: It is continuous operation device

### 2.2 Safety Instructions

To ensure the safety of patients and operators, please read the following safety instructions carefully before start to operate the system.



#### Caution:

1. Please do not put the probe on the same part of the patient for a long time, especially for fetus inside pregnant mother, as fetus are growing their bones and histiocyte, which are sensitive to radiation. This is to avoid the unnecessary radiation to human body.
2. The system should be operated by qualified operator or under the qualified operator's instructions. Patient is not allowed to touch the system.
3. Please choose the power cord offered by the manufacture. The system should be plugged into a fixed power socket with protective grounding.
4. When using power plug, please DON'T use any connector or adaptor (e.g. the convert board from three phase to

two phase is not allowed to use)

5. Any device not offered by the manufacturer is not allowed to use together with the system, which include the probes and accessories which are not provided by the manufacturer.
6. Please never open the plastic case or panel of the system when the system is powered on. If it is need to open , only the qualified operator is allowed to do this after the system is powered off.

Maintenance and Examination : After being used for a period, due to the distortion and abrasion of mechanic parts, the electronic safety features or mechanical safety features may be reduced, and image quality may changed due to the reduction of sensitivity and resolution. To make sure the system still operate normally, regular maintenance and examination plan should be taken by users to prevent the occurrence of accident and misdiagnosis.

## 2.3 Environment Requirements

### 2.3.1 Working environment

- The ultrasound system should be operated, preserved and transported under the following conditions:

Conditions Parameters	Operation	Preservation	Transportation
Temperature	5℃~ 40℃ -5	℃~40℃ -30	℃~55℃
Humidity	30%~80%, no condensation	Less than 80%, no condensation	Less than 95%, no condensation
Atmospheric pressure	86kPa~ 1 06kPa	86kPa~ 1 06kPa	50kPa~ 1 06kPa

**! Caution:** When moved into a room from outside after transportation, the ultrasound system might be still too cold or too warm comparing to the indoor temperature. Because of the temperature difference, water may condense inside the machine. Therefore before turning on the power, the system should be put inside the room for a while to adapt to the environment.

If the outside temperature is below 10℃ or above 40℃, the system need to be put for half an hour for adapting before operation. And adapting time need to be prolonged for 1 hour for each additional temperature difference of 2.5℃.

## 2.4 Important Notes for Operation







**Caution:**





1. The ultrasound system should be used far away from the strong electromagnetic field (e.g . transformer). Otherwise, the system will be disturbed

2. The ultrasound system should be used far away from high-frequency radioactive device (e.g. mobile phone). Otherwise, the system will get damaged or be affected.
3. To avoid the damage to the system, please don't operate the system under the following environment:
  - Environment with direct expose to sunshine
  - Environment with sharp temperature change
  - Environment full of dust
  - Environment with vibration
  - Environment near to heating source
  - Environment with high humidity
4. Please wait at least 1 minute to restart the system after it is turned off. Otherwise, it may result in a malfunction of the system.
5. After using the probe, you may use sponge dipped by clean water to clear away the ultrasound gel remaining on the probe and then put the probe into the probe holder. Please keep the probe clean and dry.
6. The probe must be connected or disconnected only when the system is powered off. Otherwise, it may result in a malfunction of the system.
7. Operator can record of the examination information (including hospital and patient information etc). To ensure data safety, please back-up the information frequently ,as data stored in the system may be lost due to careless mis-operation.
8. Please read all the operation instructions within this manual carefully.
9. If the system is operated in a room with small space, the room temperature may rise, please keep the room well ventilated.
10. The fuse inside the system may be replaced, and only the service people or technician authorized by the manufacturer is allowed to do the replacement.

## 2.5 Symbols and meanings

The meaning of mark and symbol used by the system and manual is listed as below:

Caution	To avoid any damage to the system, to ensure the normal and effective operation of the system, and to avoid any harm on the operator and patient, the following precautions should be observed strictly.
	Type BF equipment
	Protective earth (grounding )
	Earth (signal grounding )
	Equipotentiality

	er off
	po wer on
	Brightness of monitor
	Contrast of monitor

## Chapter 3 System Introduction & Installation

### 3.1 Outlook



Fig. 3-1 The outlook of the system

### 3.2 Main unit dimensions:

420mm (Length) ×300mm (Width) ×350mm (Height)

### 3.3 Name of main components

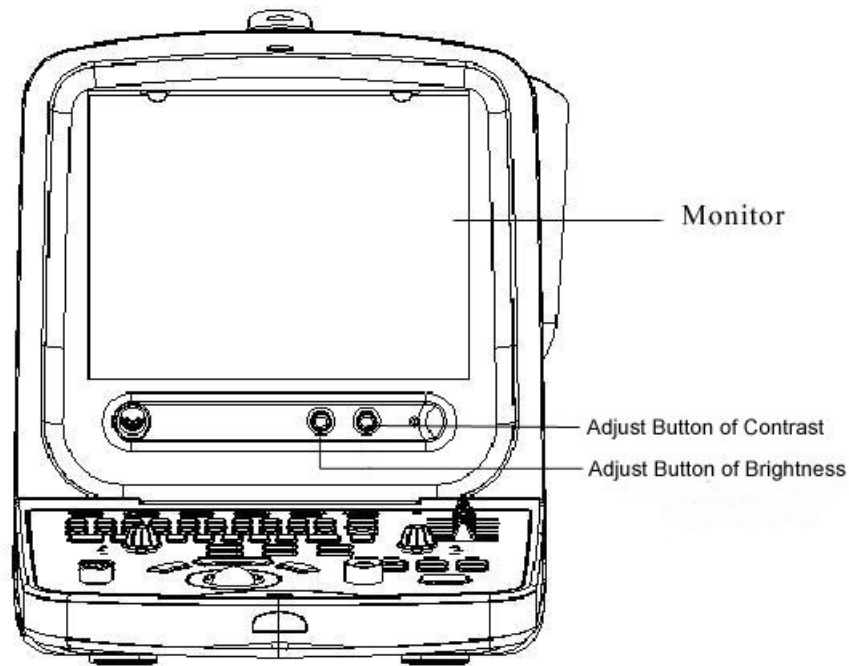


Fig. 3-2 Front Side

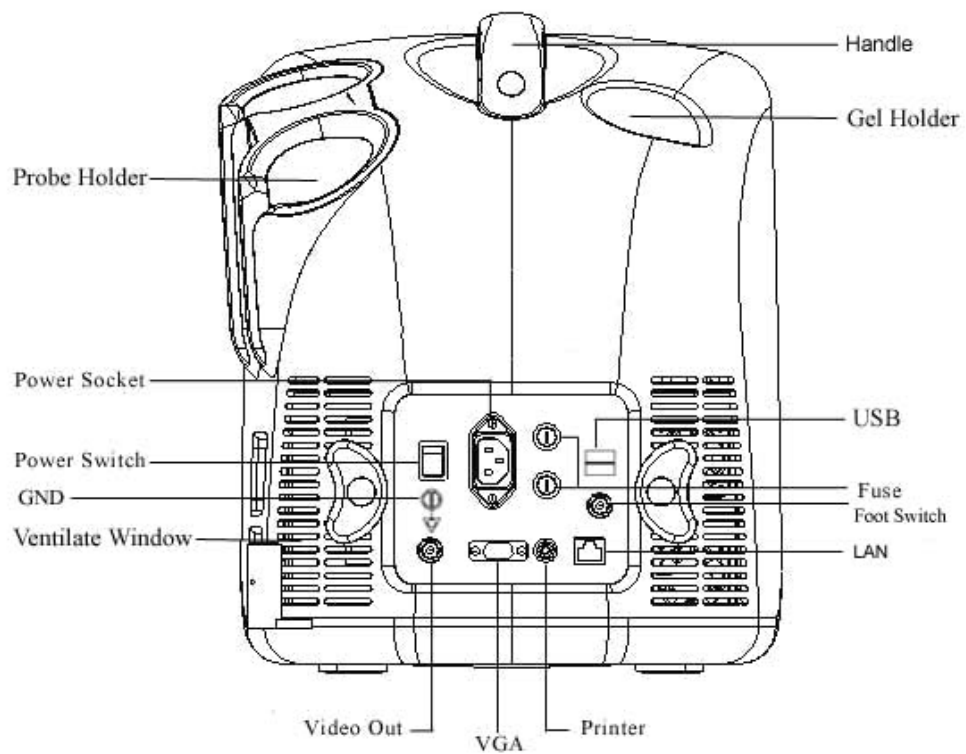


Fig. 3-3 Back Side

### 3.4 Keyboard

The keyboard layout is as follows:

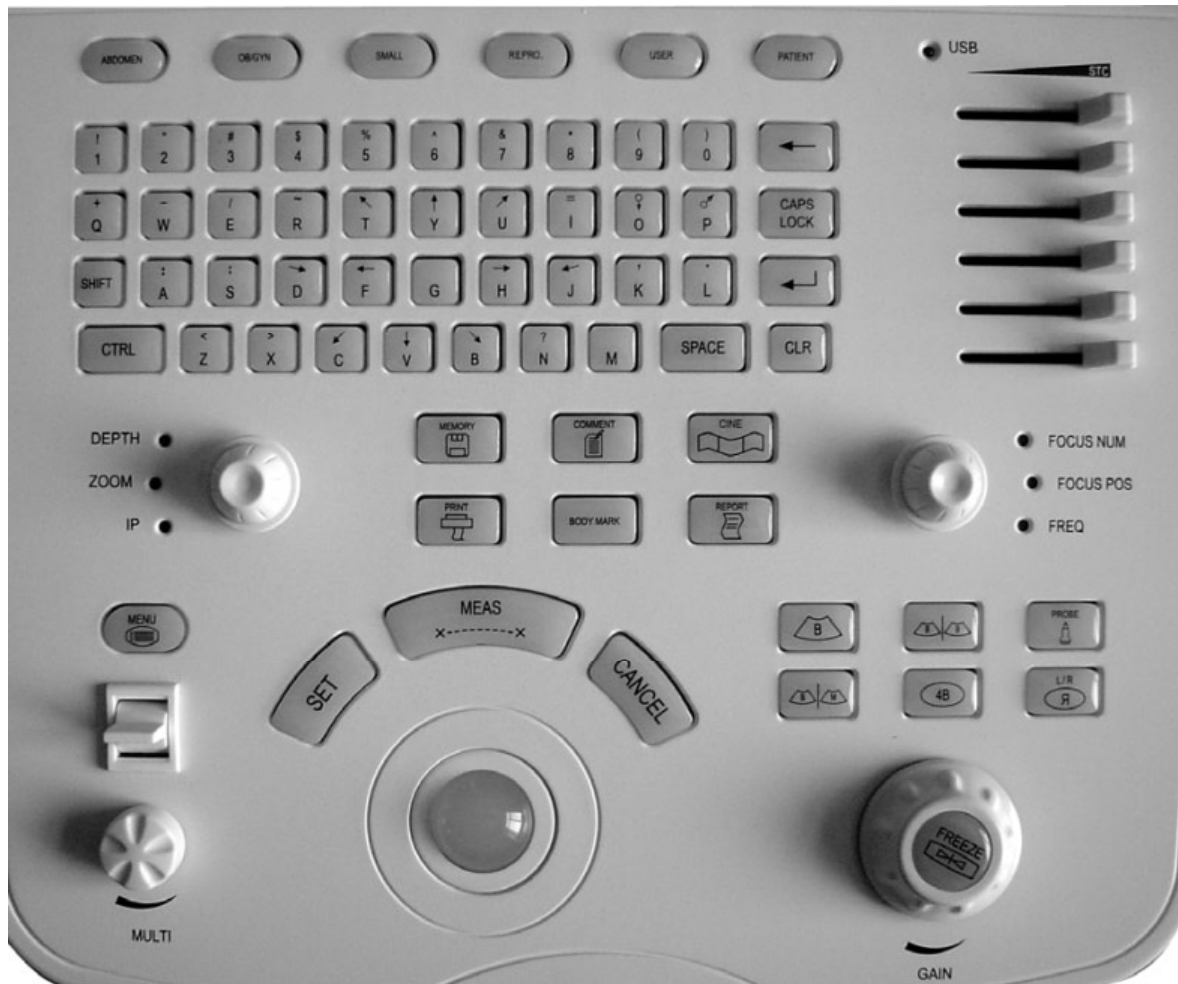


Fig. 3-4 Keyboard layout

### 3.5 Installation Procedure



**Note:** Please do not turn on the power switch until finishing all the installation and necessary preparation.

#### 3.5.1 Environment Condition

The system should be operated under the following environments.



### 3.5.1.1 Working environment

Ambient temperature: 5°C~40°C

Relative humidity: 30%~80%, no condensation

Atmospheric pressure: 86kPa~106kPa

### 3.5.1.2 Working space

Please leave enough free space (at least 20cm) on the left and the back side of the system.



**Note:** This is to ensure well ventilation for the system, as the heat will come out from the ventilation window near the left and back side of the system. Otherwise temperature inside the system will increase after operating for a certain time, malfunction may be occur due to the heat.

## 3.5.2 Connecting the electric power

After making sure that the AC power supply in hospital is in normal status, and this AC voltage type agrees to the power requirements indicated on the label of system( Please refer to Chapter 1, section 1.5.2 about 'Power requirement' for more details), then please connect the plug of power cord to the POWER IN socket at the rear panel of the system, and connect the other end of power cord to the AC power supply socket in hospital.

Please use the power cable provided by the manufacturer, other type of power cable is not allowed.



**Caution:** connecting the system to the wrong AC power supply may cause damage to the system and danger to the operators and patients. For example, it's forbidden to connect 110V system to the AC 230V power.

### 3.5.2.1 Grounding terminal

The power cable provided by the manufacturer is a three-wire cable, and it use three-pin grounded plug, among which there's a grounding terminal connecting to the grounding terminal of the AC power supply of the hospital during use. Please make sure the grounding terminal of the hospital AC power supply is in a good condition.



**Caution:** Please do not replace the three-pin grounded plug (which provided with the power cable by manufacturer) with other type of two-pin plug, otherwise it will cause the electric shock and danger to operator.

### 3.5.2.2 Equipotentiality terminal



is the symbol of the equipotentiality. It is to equalize the grounding terminals between this system and the other electronic equipments which are connected to this system.



Caution: When this system is connected to other electric equipments, please connect the equipotentiality terminals of each equipment together with the equipotentiality cable; otherwise it will cause the electric shock. The ultrasound system must use the power cord provided by the manufacturer, and the power cord cannot be replaced randomly. Meanwhile reliable grounded protection must be assured.

### 3.5.3 Installation and removal of the probes



Caution: Please ONLY use the probes provided by manufacturer for this model, other types of probes are not allowed to use with this system! Otherwise it may cause the damage to the system and the probe.

#### 3.5.3.1 Probe installation procedure

**Warning:** Before connecting the probe, please carefully check the probe lens, probe cable and probe connector to see whether there is anything abnormal, such as cracks, falls off. Abnormal probe is not allowed to connect to the system, otherwise there is possibility of electricity shock.

1. Turn off the unit first.
2. Take the probe out of probe box, check the appearance of probe lens, probe cable, probe connector, to make sure there's nothing abnormal.
3. Put the probe lock knob to open status, see Fig 3-5-2, make sure the small tongue of probe lock inside the probe connector is at the same position of slot on the probe socket; see Fig :3-5-1

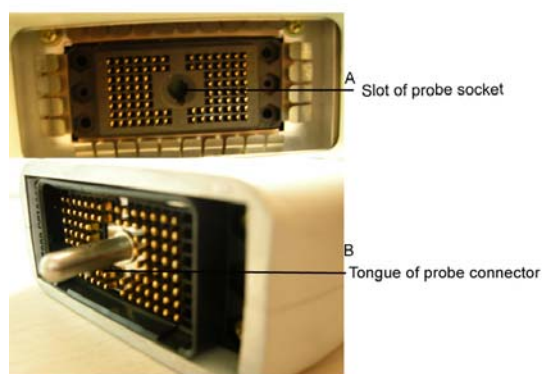


Fig. 3-5-1 Probe socket and probe connector position

4. Then horizontally insert the probe connector into the probe socket steadily until it completely reach the bottom of the socket, hold the probe connector and use another hand to turn the lock knob to the 'LOCK' position; see Fig 3-5-3.



Fig. 3-5-2 Probe Open status



Fig. 3-5-3 Probe Lock status

5. Check the locked probe with one hand to make sure that it's not loose, and it's securely connected.



**Caution:** Only power supply at “turn off” state, can install / take-down the probe, otherwise it will damage the machine or the probe.



**Caution:** Before inserting the probe to the socket, please check the lock knob and lock tongue position, otherwise it will cause damage of the probe and system.



**Caution:** If probe is not correctly or completely inserted to the probe, or if probe is not securely connected to the socket, this may cause misoperation, eg. probe cannot be recognized by the system, the probe will be misrecognized, the probe may drop off from the main unit and have damage.



**Warning:** During probe installation and removal, please put the probe head inside the probe holder, it can prevent the probe falling down to the ground.

### 3.5.3.2 Removal of the probe

1. Turn off the unit first, put the probe head inside the probe holder.
2. Turn the lock knob in an anti-clockwise direction to the ‘OPEN’ position, see Fig 3-5-2 Then remove the probe connector slightly out from the probe socket.



**Caution:** When inserting the probe, please make sure the surface which has CHISON green logo is always upside.

Correct operation figure as Fig 3-5-4 and wrong operation figure as Fig 3-5-5



Fig. 3-5-4 Correct Insert position



Fig. 3-5-5 Wrong Insert position

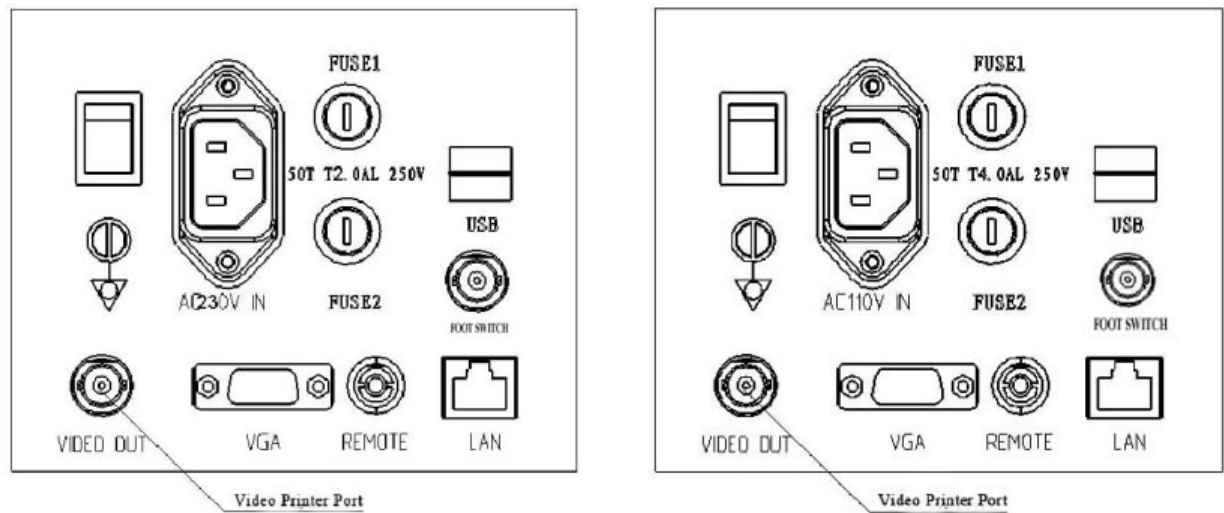
### 3.5.4 Installing optional parts



**Caution:** Please only use the optional parts provided or suggested by manufacturer! Using other types of optional devices may cause the damage to the system and the connected optional devices.

#### 3.5.4.1 Installing the Video Printer

1. Put the video printer steadily beside the main unit.
2. Connect one terminal of the video cable to the VIDEO IN socket at the rear panel of the video printer, and connect the other terminal of the video cable to the VIDEO OUT socket at the rear panel of the system.
3. Connect one terminal of the printer remote control cord to the printing control terminal at the rear panel of the video printer, and connect the other terminal of the remote control cord to REMOTE port at the rear panel of the system.
4. Connect the power cord of the video printer to the power socket, turn on the video printer.
5. Adjust the parameters on the back of the video printer according to the selected type of print paper.
6. Adjust other parameters on the printer control panel to have the best print quality. Please refer to the user manual of the video printer for more details.



AC 230V IN

AC 110V IN

Fig. 3-6 Rear panel of the system



**Warning:** It is strictly prohibited to use any power cable other than the ones provided by the manufacture. Otherwise there is possibility of electricity shock.

#### The meaning of symbol on video printer:



: video signal input



: video signal output



: printing control terminal

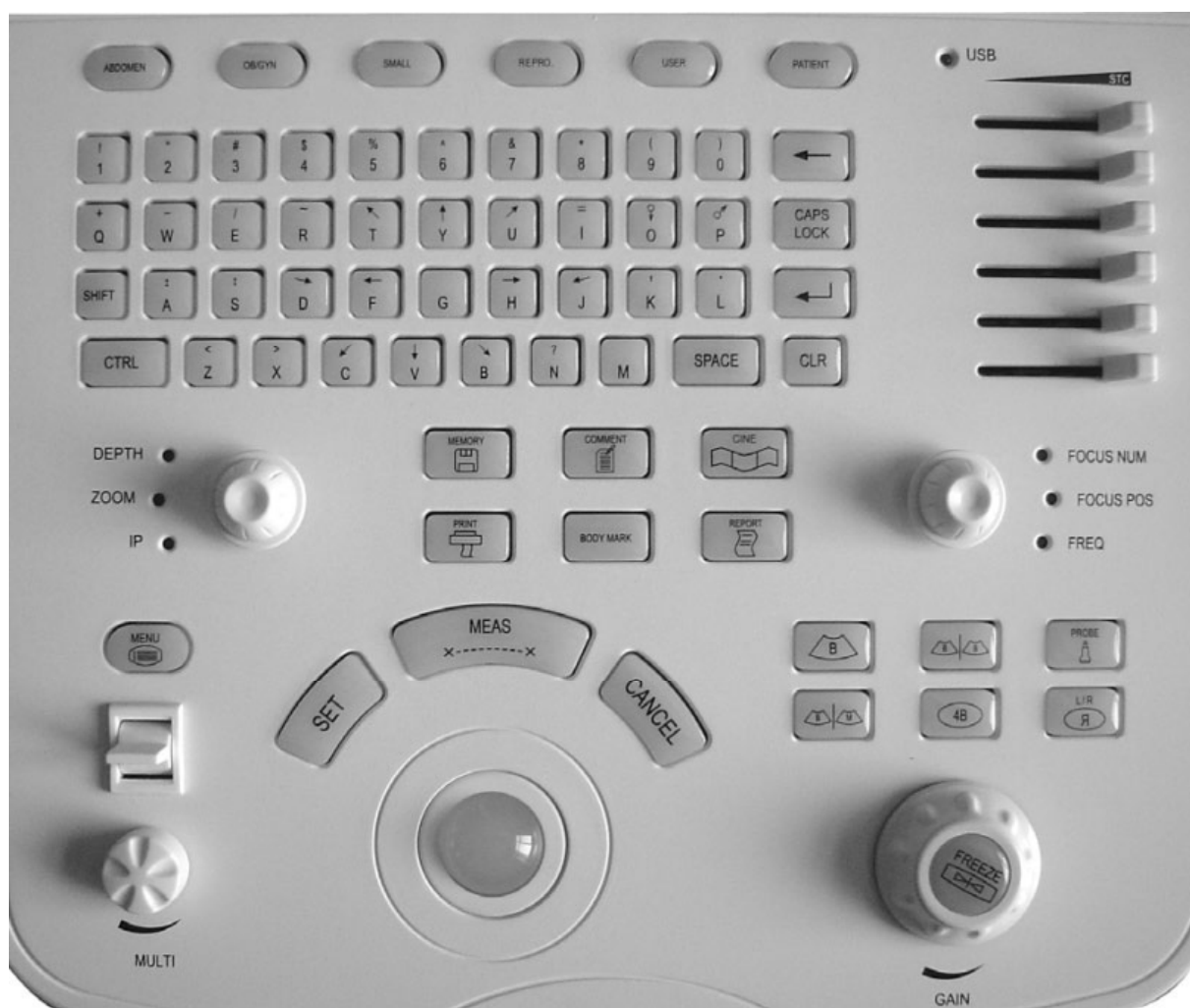


: power switch of video printer

## Chapter 4 Keyboard

### 4.1 Outlook of the keyboard

Please refer to chart of keyboard in Chapter 3: Fig. 3-4.



Keyboard layout

The function of each key are listed as below:

### 4.2 Alphanumeric keyboard

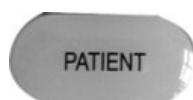


Fig. 4-1 Alphanumeric keyboard

The alphanumeric keys are used for inputting annotations and patient information etc.

## 4.3 Special function keys/knob

### 4.3.1 PATIENT

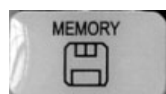


Set up a new patient data, and can input patient name and other information.

When set up a new patient data, you can exit the dialog box directly by pressing the **【PATIENT】** key.

You may use Toggle-switch key as TAB key in Windows to fast locate the cursor when setting up a new patient data.

### 4.3.2 MEMORY



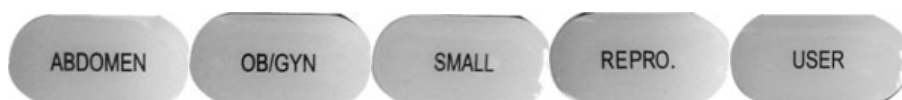
Save and recall still images, save and recall patient information, manage files. It is only available at frozen status.

### 4.3.3 MULTI



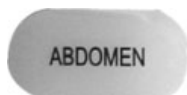
Multi-function knob, used to adjust the settings of parameters in the menu, e.g. adjusting acoustic power, frame averaging etc.

## 4.4 Examination mode keys



According to the clinic diagnostic need, operator can select the exam mode: e.g ABDOMEN, OB/GYN, SMALL PARTS, REPRODUCTION, and USER-DEFINED mode. The default presets for each examination mode have been already saved in the system before delivery, so when operator select the examination mode key, it will recall the default preset of that examination mode. It's easier and quicker for operator to use.

### 4.4.1 ABDOMEN



Abdomen examination mode

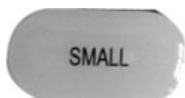
### 4.4.2 OB/GYN



OB/ GYN examination mode

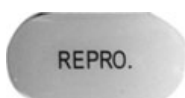


#### 4.4.3 SMALL



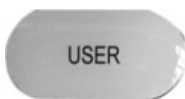
Small parts examination mode.

#### 4.4.4 REPRODUCTION



Reproduction examination mode.

#### 4.4.5 USER



User – defined examination mode

### 4.5 Track ball, SET key, CANCEL key

#### 4.5.1 Track ball



Trackball is the main operation tool, which can be used for the selection of menu and moving the direction of cursor. Normally the trackball controls the position of cursor. When it is used with different keys together, it will have different functions.

### 4.5.2 SET



SET key is a multi-function key and is used together with the trackball. It executes different function in different working status, such as fixing the cursor position, comment position, or selecting the menu, confirming input etc.

### 4.5.3 CANCEL



CANCEL key is a multi-function key and used together with the track ball. It executes different functions in different working status, such as recalling annotation database, cancelling the previous measurement step, previewing the image etc.

## 4.6 Display mode keys

### 4.6.1 B mode



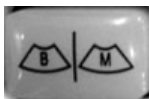
Display image in the B mode

### 4.6.2 B/B mode



Display two single B mode images at the same time.

### 4.6.3 B/M mode



Display B mode image and M mode image at the same time.

If you press the key twice, the system will enter into M display mode.

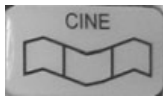
### 4.6.4 4B mode



Display 4 single B mode images at the same time.

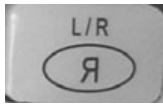
## 4.7 Image control keys

### 4.7.1 CINE



Start cine-loop function manually.

### 4.7.2 L/R

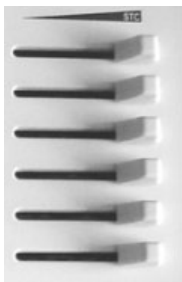


Left/right reversing of B-mode image.

When **【SHIFT】** + **【L/R】** is pressed, it can do Up/Down reversing of B-mode image.

## 4.8 Image adjustment keys

### 4.8.1 STC



Adjust gain compensation in different depth segment.

#### 4.8.2 GAIN key / FREEZE button



- 1) When rotate it in real-time status, it adjusts the total gain.
- 2) When press it, it will freeze or de-freeze the image.

#### 4.8.3 FOCUS NUM/FOCUS POS/FREQ knob



- 『FOCUS NUM』 Rotate it to adjust the focus number from 1 to 4, when its light is lit on lit
- 『FOCUS POS』 Rotate it to adjust the focus position, when its light is lit on lit
- 『FREQ』 Rotate it to adjust the probe frequency, when its light is lit on lit

#### 4.8.4 DEPTH/ZOOM/IP knob



- 『DEPTH』 Rotate it to adjust scanning depth, when its light is lit on lit
- 『ZOOM』 Rotate it to adjust the zooming step, when its light is lit on lit
- 『IP』 Rotate it to select IP setting (image processing), when its light is lit on lit

## 4.9 Operation mode keys

### 4.9.1 MEAS



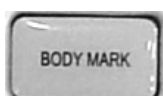
Press this key to enter the measurement status

### 4.9.2 COMMENT



Press this key to enter comment status, and add comments in the image area on the screen.

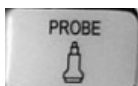
### 4.9.3 BODYMARK



Press this key to enter Body mark working status, select the body mark and the probe scanning position on the screen. It is only available in frozen status.

## 4.10 Probe control keys

### 4.10.1 PROBE



Probe selection key. It can only select the connected probe.

### 4.10.2 FREQ

Please refer to 4.8.3 to adjust the multi-frequency step.

## 4.11 Other function keys

### 4.11.1 MENU



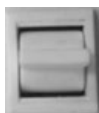
Display or hide the menu bar

### 4.11.2 REPORT



Produce/Save/Recall an exam report

### 4.11.3 Toggle-switch key



Fast select menu item up and down; fast locate the cursor (same as TAB key's function in Windows) when setting up new patient data or making comments in the report page; fast select menu item when using Save/Recall function

### 4.11.4 CLR



Clear measurement trace & results, body marks and annotation characters on the screen.

### 4.11.5 PRINT



Print the screen image directly when video printer is connected to the system.

### 4.3.1 PATIENT



Set up a new patient data, and can input patient name and other information.

When set up a new patient data, you can exit the dialog box directly by pressing the **【PATIENT】** key.

You may use Toggle-switch key as TAB key in Windows to fast locate the cursor when setting up a new patient data.

### 4.3.1 PATIENT



Set up a new patient data, and can input patient name and other information.

When set up a new patient data, you can exit the dialog box directly by pressing the **【PATIENT】** key.

You may use Toggle-switch key as TAB key in Windows to fast locate the cursor when setting up a new patient data.

### 4.3.1 PATIENT



Set up a new patient data, and can input patient name and other information.

When set up a new patient data, you can exit the dialog box directly by pressing the **【PATIENT】** key.

You may use Toggle-switch key as TAB key in Windows to fast locate the cursor when setting up a new patient data.

### 4.3.1 PATIENT



Set up a new patient data, and can input patient name and other information.

When set up a new patient data, you can exit the dialog box directly by pressing the **【PATIENT】** key.

You may use Toggle-switch key as TAB key in Windows to fast locate the cursor when setting up a new patient data.

## Chapter 5 Main Interface

This chapter will introduce image display modes and the image interface.

### 5.1 Select display mode

There are five image display modes: B, B/B, 4B, M, B/M, and different mode can be shifted by pressing mode key.



Fig. 5-1 Display Mode key

#### 5.1.1 Single B mode

Press **【B】** mode key to display single B mode image. B mode is the basic operating mode for two-dimensional scanning and diagnosis. See single B image interface as below:



Fig. 5-2 B mode

#### 5.1.2 B/B mode

Press **【B/B】** mode key twice to display double B mode images. One image is in real-time status; the other is in frozen



status. The real-time image is marked by “▼”.

Press **【B/B】** mode key in B/B mode, the original active image is frozen while the original frozen image is activated and is ready for real-time scan.



Fig. 5-3 B/B mode

### 5.1.3 4B mode

Press **【4B】** key, to enter 4B mode, but only one image is in real-time status, Press **【4B】** key can switch the real-time status among four images.



Fig. 5-4 4B mode

### 5.1.4 B/M mode

Press **【B/M】** mode key to display real time B-mode image and real-time M-mode image at the same time. And a dotted sampling line will appear in the B-mode image area, which indicates the active sampling position for M image on the B image area. Moving the trackball can change the position of line-sampling. Press **【SET】** to fix the position of sampling line.

Press **【B/M】** key again, B mode image will disappear, M mode image is still active in the whole screen.

Press **【FREEZE】** key to freeze both B mode image and M mode image.

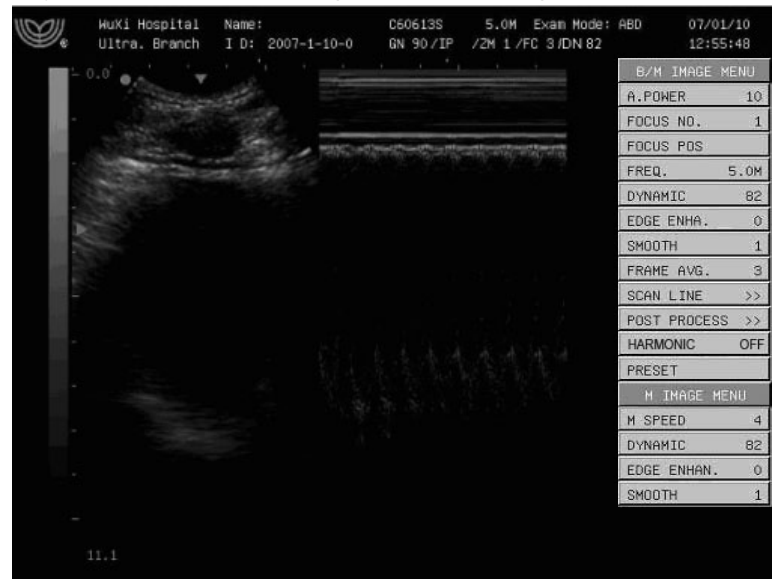



Fig. 5-5 B/M mode

 **Note:** Before confirming the position of sampling line, the cursor cannot be moved out of B image area.

### 5.1.5 M mode

In B/M mode, press **【B/M】** key again, and it will display single M mode image. M mode image stands for the tissue movement status at the sampling position indicated by the sampling line. The M mode image display varies with time, so it is mainly used for cardiac examination.

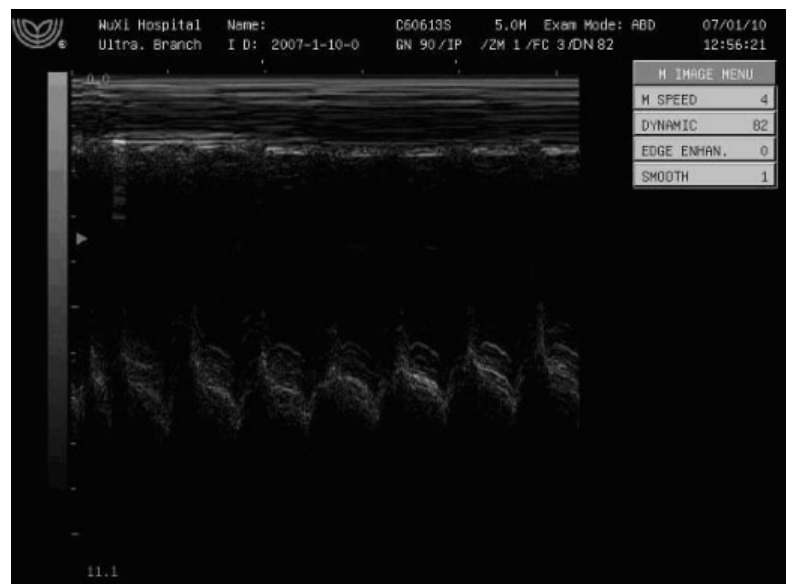


Fig. 5-6 M mode

## 5.2 Image interface display

Take B mode as an example:

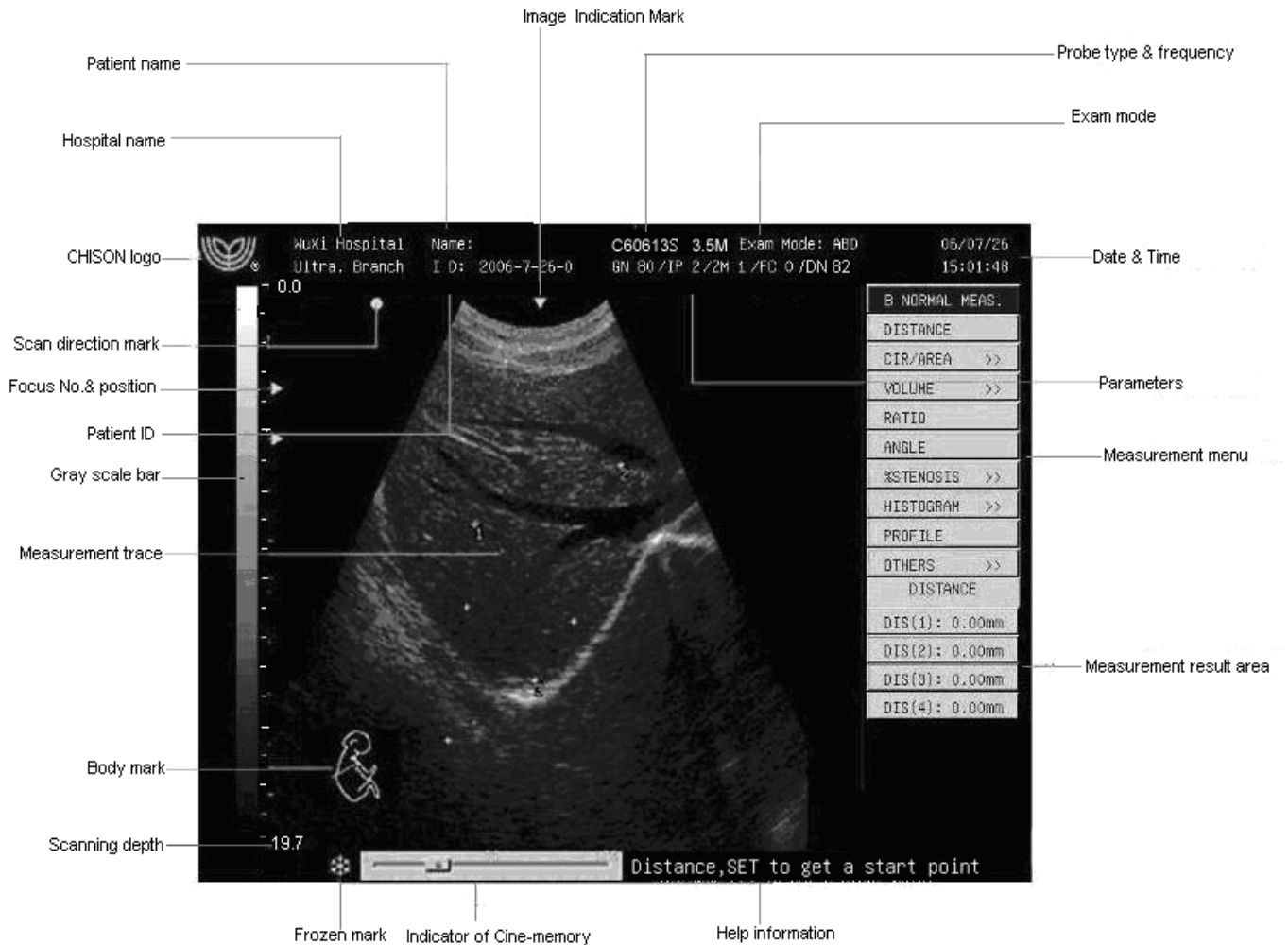


Fig. 5-7 B mode interface

## Chapter 6 Image control and adjustment

This chapter describes the operation of image control and adjustment, including adjustment of image parameters, zooming function and image reversing etc.

### 6.1 Adjustment by keyboard

Users can adjust image parameters by using **【MULTI】** functional knob and the menu bar. Most of the parameter values are displayed on the top of the screen, see picture as below:

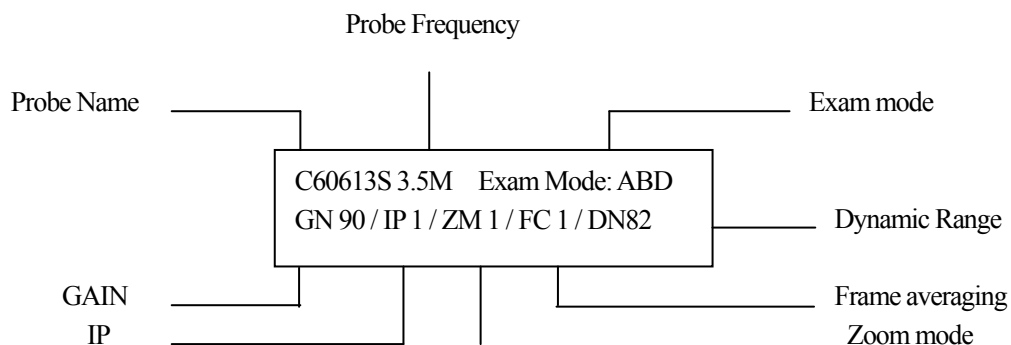


Fig. 6-1 Image parameter display area

#### 6.1.1 Total gain

At the real-time status, turn [GAIN] knob to adjust the gain value from 0 to 99 dB, the adjustable level is 1 dB/level.

Gain value displays at the upper part of the screen.



Fig. 6-2 Gain knob



**Caution:** Gain value cannot be adjusted in image frozen status!

### 6.1.2 STC

STC curves can be used for adjusting gain compensation in different image depth. The corresponding STC curves changes by moving the STC slide knob. During adjustment, the STC curve will appear automatically on the left of the screen, Show as follows:

STC curve will disappear automatically 1 second later after stopping adjustment.



Fig. 6-3 STC curve adjustment



**Caution:** At frozen status, adjusting STC slide will not be effective.

### 6.1.3 Depth of image

Press the [DEPTH/ZOOM/IP] selection knob until the indicator of [DEPTH] is lit, and then turn the knob to change the depth of image.



Fig. 6-4 DEPTH / ZOOM / IP selection knob



**Caution:** The depth can not be adjusted when the image is frozen.

### 6.1.4 Zoom function

Press the **[DEPTH/ZOOM/IP]** selection knob until the indicator of **[ZOOM]** is lit, turn the knob to change image zooming step and its value displays in the parameter display area. There are 4 kinds of zooming mode: 1 to 4.



**Caution:** The image can not be zoomed when it is frozen.

### 6.1.5 IP

IP is the combination of a group of image processing parameters (dynamic range, edge enhancement, smoothness, frame averaging), which represents the image processing effect.

The value range of IP is 0~9, represents the effect of 10 kinds of image processing respectively. In default IP setting, the larger IP value is, and the greater the contrast of image is.

Press the **[DEPTH/ZOOM/IP]** selection knob until the indicator of **[IP]** is lit, turn the knob to change IP value.




**Caution:** IP value is only available for the image in real time status.


### 6.1.6 Image reversing


B mode image and B/M mode image can be reversed horizontally and vertically.

Press the **【L/R】** key, the displayed image is reversed in the right-left horizontal direction.

Press the **【SHIFT】 + 【L/R】** key (press SHIFT key first, then press L/R key), the displayed image is reversed in the up-down direction.

The meaning of the symbol “” indicating the probe initiative scanning position

“” situated in the left: indicating that the first scanning line in the left of the screen is corresponding to the initiative scanning position of the probe,

“” situated in the right indicates that the first scanning line in the right of the screen is corresponding to the initiative scanning position of the probe.

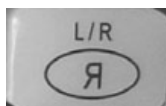


Fig. 6-5 Horizontal reversing key

## 6.2 Image Menu adjustment

### 6.2.1 Acoustic power

Acoustic power means the acoustic power transmitting from the probe.

At the real-time status, move the cursor to menu item-“**A. POWER**” in [**B IMAGE MENU**] or [**B/M IMAGE MENU**], the menu item gets high-lighted. Turn **【MULTI】 knob** clockwise, the value will increase. If turn **【MULTI】 anticlockwise**, the value will decrease. The current acoustic power value displays directly in the menu item. The adjustment range of Acoustic power is 0 to 11.

B IMAGE MENU	
A. POWER	10
FOCUS NO.	1
FOCUS POS	
FREQ.	5.0M
DYNAMIC	82
EDGE ENHA.	0
SMOOTH	1
ZOOM	OFF
FRAME AVG.	3
SCAN LINE	>>
POST PROCESS	>>
BIOPSY	
HARMONIC	OFF
PRESET	

Fig. 6-6 B IMAGE MENU



**Caution:** The adjustment of the acoustic power is not available in the frozen status.

### 6.2.2 Focus number

In B mode, maximum 4 focus points can be selected simultaneously.

Adjusting methods:

Press the **[FOCUS NUM/FOCUS POS/FREQ]** selection knob until the indicator of **[FOCUS NUM]** is lit, turns the knob to change focus number. Or move the cursor to the menu item **[FOCUS NO. ]** in **B IMAGE MENU**, turn **【MULTI】 ] knob** to change the focus number and the current focus number is displayed in the menu item directly.



Fig. 6-7 FOCUS NUM / FOCUS POS / FREQ selection knob



**Caution:** Focus number can not be changed in frozen status.



**Note:** There is only 1 focus in B/M or M display mode, so Focus number can not be changed in B/M or M display mode.

### 6.2.3 Focus position

Press the **[FOCUS NUM/FOCUS POS/FREQ]** selection knob until the indicator of **[FOCUS POS]** is lit, turn the knob to change Focus Position, or move the cursor to menu item-“**FOCUS POS**” in **[B IMAGE MENU]** or **[B/M IMAGE MENU]**, and then turn **[MULTI]** knob to change the focus position.

When changing the focus position, multiple focuses can move at the same time(if Focus No. is more than 1), and the focus can not be moved out of the image display area.



**Caution:** Focus position can not be changed in the frozen status.

### 6.2.4 Dynamic range

Dynamic range is used for adjusting the contrast resolution of B mode image, compressing or enlarging the display range of gray scale.

The dynamic adjustment range from 30 to 90, and its adjustment level is 4dB/step.

To adjust “dynamic range”, please select menu item-“**DYNAMIC**” in **[B IMAGE MENU]**, **[B/M IMAGE MENU]** or **[M IMAGE MENU]** first, the current value of dynamic range is displayed in the menu item. The adjustment method is the same as that of acoustic power.



**Caution:** Dynamic range cannot be adjusted when the image is frozen.



B/M IMAGE MENU	
A. POWER	10
FOCUS NO.	1
FOCUS POS	
FREQ.	5.0M
DYNAMIC	82
EDGE ENHA.	0
SMOOTH	1
FRAME AVG.	3
SCAN LINE	>>
POST PROCESS	>>
HARMONIC	OFF
PRESET	
M IMAGE MENU	
M SPEED	4
DYNAMIC	82
EDGE ENHAN.	0
SMOOTH	1

Fig. 6-8 B/M IMAGE MENU

### 6.2.5 Edge enhancement

Edge enhancement is used for enhancing the image outline. In this way the user can view the tissue structure more clearly. Its range is 0~3. 0 stands for no edge enhancement, and 3 stands for the maximum edge enhancement.

To adjust “edge enhancement”, please select menu item-“**EDGE ENHA.**” in [**B IMAGE MENU**] or [**B/M IMAGE MENU**] first, the current value of edge enhancement is displayed in the menu item. The adjustment method is the same as that of acoustic power.



**Caution:** Edge enhancement cannot be adjusted when the image is frozen.

### 6.2.6 Smoothness

Smoothness function is used for restraining the image noise and performing axial smooth processing to make the image smoother.

Its range is 0~3. 0 stands for no smoothness processing, 3 stands for the maximum smoothness processing.

To adjust “smoothness”, please select menu item-“**SMOOTH**” in [**B IMAGE MENU**] or [**B/M IMAGE MENU**] first, the current value of smoothness processing is displayed in the menu item. The adjustment method is the same as that of acoustic power.



**Caution:** Smoothness cannot be adjusted when the image is frozen.

### 6.2.7 Partial zoom function

Partial zoom function is adjustable by using menu item-“ZOOM” and **【MULTI】** knob. The partial zoom is changed by different sample frame and by different zooming mode.

The method for adjustment:

1. Press [DEPTH/ZOOM/IP] knob until the [ZOOM] light is lit.
2. Turn knob, the interface will display the desired zoom mode (From ZM 1 to ZM 4), and the sample frame will appear in the center of the screen, like Fig.6-9.
3. Turn the trackball to move the sample frame to the required area
4. Press **【SET】** key and the image within the sample frame will be zoomed in according to selected zoom mode, and the sample frame will disappear,
5. To quit zoom status, press[ZOOM] knob again, when the [ZOOM] light is off.

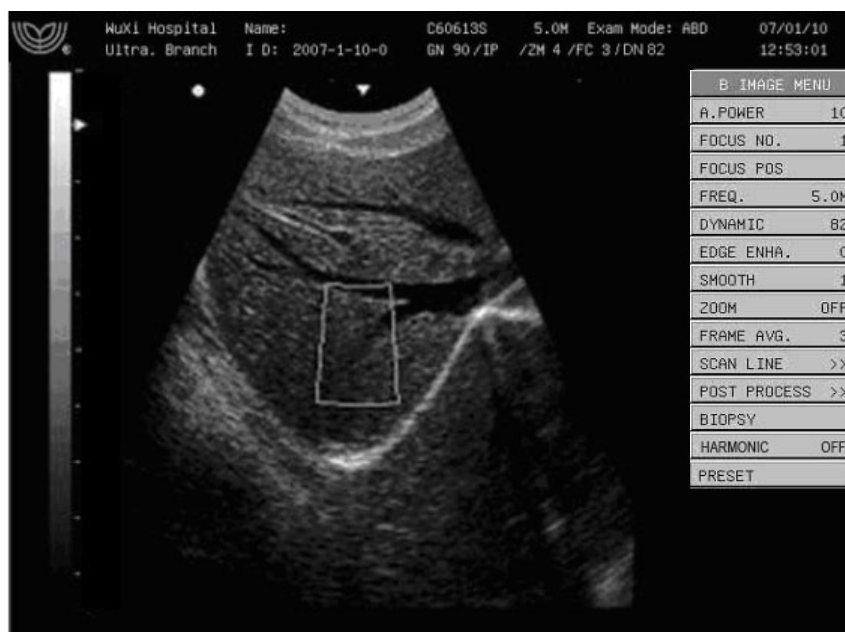


Fig. 6-9 Zoom in the image



**Caution:** Zoom function is not available in the frozen status.



**Note:** Zoom function is only available for the image in B mode.

### 6.2.8 Frame averaging

Frame averaging function is used to overlap and average the adjacent B mode images so as to reduce the imaging noise and make the image clearer.

Its range is 0~7. 0 stands for no frame averaging, and 7 stands for the adjacent continuous 8 frames of image to be overlapped and averaged.

Frame averaging is valid for the image in B mode, B/B mode, B/M mode or 4B mode. To do the adjustment, please select menu item-“**FRAME AVG**” in [**B IMAGE MENU**] or [**B/M IMAGE MENU**] first, the current value of frame averaging is displayed in the menu item. The adjustment method is the same as that of Acoustic power.



**Caution:** Frame averaging cannot be adjusted when the image is frozen.

## 6.2.9 M speed

M Speed function is to adjust the sweep speed of M mode image.

Its range is 1~4: 1 stands for the slowest M mode sweep speed, 4 stands for the fastest M mode sweep speed.

M Speed is only valid for M mode image. To adjust “M speed”, please select menu item-“**M SPEED**” in [**M IMAGE MENU**] first, the current M Speed value is displayed in the menu item. The adjustment method is as the same as that of Acoustic power.



**Caution:** M Speed cannot be adjusted when the image is frozen.

## 6.2.10 Scanning line mode

### 6.2.10.1 Scan Angle

Use Scan Angle function to adjust the scan angle of the B mode image. This function is only valid for the image in B mode, B/B mode, B/M mode or 4B mode. The scan angle is related to the frame rate. The smaller the scan angle is, the higher the frame rate is.

Its range is 0~3: 0 stands for the smallest scan angle, 3 stands for the largest scan angle.

To do the adjustment, please select submenu item-“**SCAN ANGLE**” in [**SCAN LINE**] submenu in [**B IMAGE MENU**] or [**B/M IMAGE MENU**] first, the current value of scan angle is displayed in the menu item. The adjustment method is the same as that of Acoustic power.



**Caution:** Scan angle cannot be adjusted when the image is frozen.

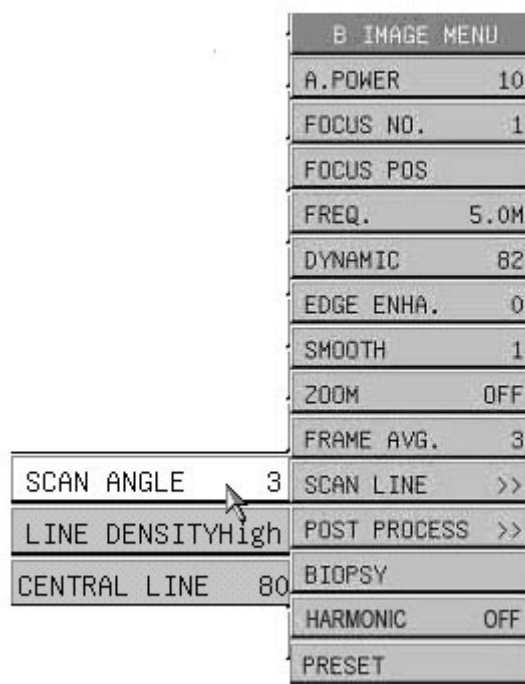


Fig. 6-10 Adjustment of scan angle

### 6.2.10.2 Scan Line Density

Scan Line Density function is used to adjust the density of the scan lines on B mode image. This function is only valid for the image in B mode, B/B mode, B/M mode or 4B mode image. The line density has two types: high density and low density. High density means better image quality while low density image has higher frame rate. The central line of high density and low density is the same with 80.

To do the adjustment, please select the submenu item-“**LINE DENSITY**” in [**SCAN LINE**] submenu in [**B IMAGE MENU**] or [**B/M IMAGE MENU**], the current value of scan line density is displayed in the menu item. The adjustment method is as the same as that of Acoustic power.

**! Caution:** Scan line density cannot be adjusted when the image is frozen.

### 6.2.11 Post processing

Post Process function is used to adjust the gray scale of the image in order to obtain the user-required visual effect. Use menu item-“**POST PROCESS**” in [**B IMAGE MENU**] or [**B/M IMAGE MENU**] to adjust the gray transformation curve, gray rejection curve and  $\gamma$  correction on real-time respectively, and five kinds of preset post processing effect are available.

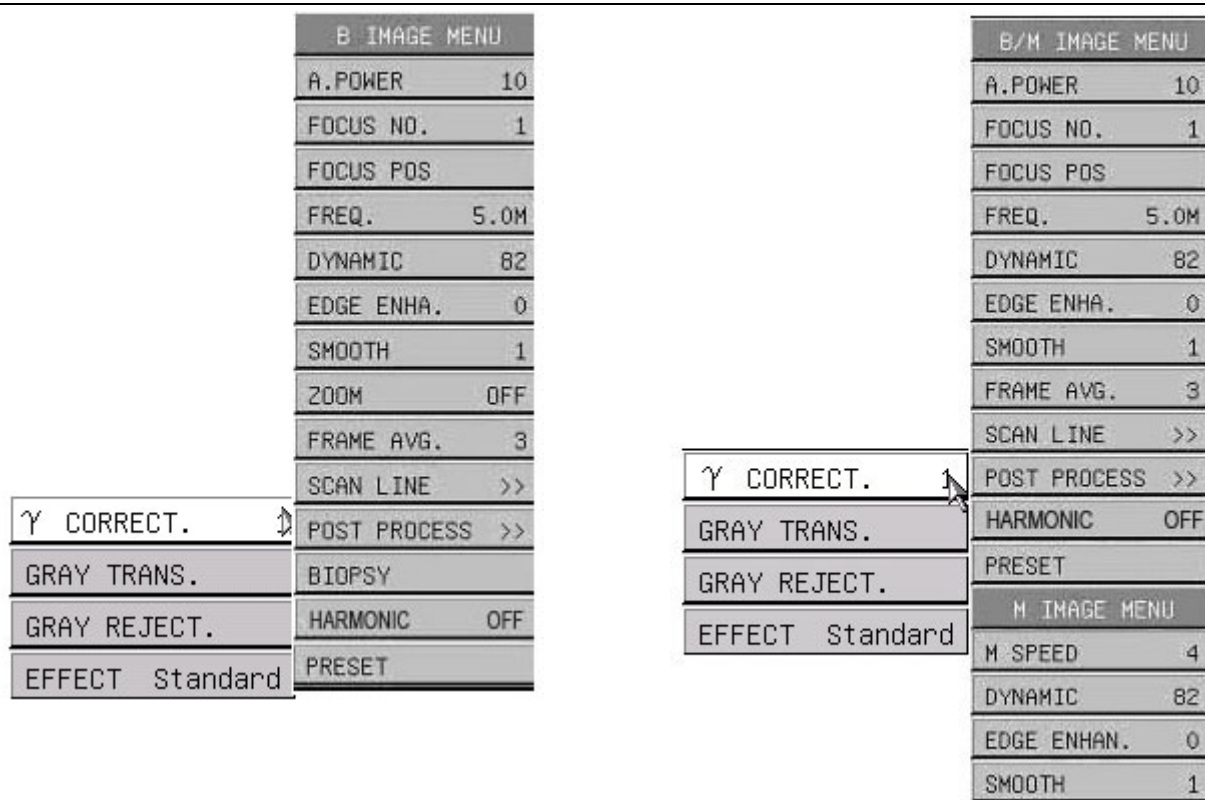


Fig. 6-11 Post processing in B IMAGE MENU and B/M IMAGE MENU



**Caution:** Post processing function is valid for real-time B mode image.

#### 6.2.11.1 $\gamma$ correction

This function is used for correcting the visual non-linear distortion in image. The parameter values for  $\gamma$  correction are 0, 1, 2, 3, which respectively represent that  $\gamma$  correcting index is 1, 1.1, 1.2 and 1.3.

Adjusting method:

Select menu item-“ $\gamma$  CORRECT.” of [POST PROCESS] submenu in [B IMAGE MENU] or [B/M IMAGE MENU], turn **【MULTI】** knob to get different  $\gamma$  correction value. The  $\gamma$  correction value will be displayed in the menu item. The adjustment method is the same as that of Acoustic power.

#### 6.2.11.2 Gray scale transformation curve

Adjusting method:

Select menu item-“GRAY TRANS.” of [POST PROCESS] submenu in [B IMAGE MENU] or [B/M IMAGE MENU], then press **【SET】** key and a dialog box of adjusting gray scale transformation will appear as follows:

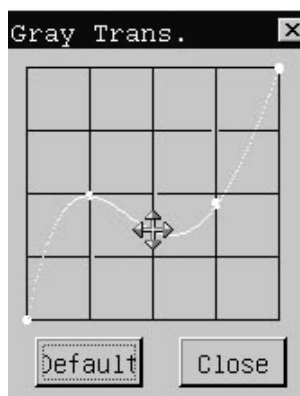



Fig. 6-12 Dialog box of adjusting gray transformation curve

Move the cursor onto one node position on the curve, the cursor will be displayed as “

“Default” button is used to recover the system default value of gray scale transformation..

### 6.2.11.3 Gray scale rejection curve

This function is used for restraining image signals that below a certain lever of gray scale.

Adjusting method:

Select menu item-“GRAY REJECT.” of [POST PROCESS] submenu in [B IMAGE MENU] or [B/M IMAGE MENU], press **【SET】** key and a dialog box of adjusting gray scale rejection will appear as Fig. 6-13.

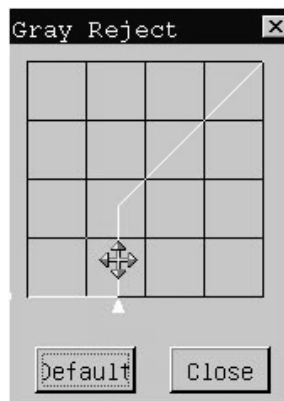



Fig. 6-13 Dialog box of adjusting gray rejection curve

Move the cursor onto the trigon point (apex of the curve), the cursor will be displayed as “

“Default” button is used to recover the system default value of gray scale rejection.

### 6.2.11.4 Effect

There are 5 kinds of post processing effects preset in the system, and each effect is the combination of gray scale

transformation, gray scale rejection, and  $\gamma$  correction. These 5 kinds of post processing effects are: Standard, High level, Low level, Equal level, and Negative.

From Standard to Negative image, contrast of image will increase gradually.

Select menu item-“**EFFECT**” in [**POST PROCESS**] submenu in [**B IMAGE MENU**] or [**B/M IMAGE MENU**], and the current effect value is in the menu item. The adjustment method is the same as that of Acoustic power.

## Chapter 7 Measurement and Calculation

### Main content of this chapter:

Normal calculation and measurement on B mode image and M mode image, OB calculation and measurement etc.

## 7.1 Keys used in measurement

### 7.1.1 Trackball

See 4.5.1

### 7.1.2 Toggle-switch key

See 4.11.2

### 7.1.3 MEAS key

See 4.9.1

### 7.1.4 SET and CANCEL key

See 4.5.2 and 4.5.3

### 7.1.5 SPACE key

During measurement of distance, circumference or area, the start point and end point can be exchanged when **【SPACE】** key is pressed.

## 7.2 Normal measurement and calculation in B, B/B and 4B mode

Press display mode key - **【B】**, **【B/B】** or **【4B】** to enter into B, B/B or 4B mode, B mode menu appears automatically at the right side of the screen. Then press **【MEAS】** key to enter into measurement status.



**Note:** When measure all the images in B/B, 4B modes, please make sure every image in the same depth. Or it makes no sense.



### 7.2.1 Distance



**Note:** If no measurement item is selected, the default measurement item is DISTANCE, press **【SET】** key to start the measurement.

B NORMAL MEAS.	
DISTANCE	
CIR/AREA	>>
VOLUME	>>
RATIO	>>
ANGLE	
%STENOSIS	>>
HISTOGRAM	>>
PROFILE	
OTHERS	>>

Fig. 7-1 B mode normal measurement menu

Measurement steps:

- ① Move the cursor with the trackball to the menu item-“DISTANCE” in **[B NORMAL MEAS.]** menu, and press **【SET】** key to select this item. Move the cursor into image area, and the cursor will be displayed as “+”.
- ② Use the trackball to move the cursor to the starting point, press **【SET】** key to fix it, the starting point is displayed as “+”.
- ③ Move the cursor-“+” to the end point. There is a dotted line connecting the cursor-“+” to the starting point “+”. If press **【CANCEL】** key, it will delete the dotted line and starting point
- ④ Press **【SET】** key to fix the end point, the end point is displayed as “+”. Then the measurement value is displayed and the measurement performance is finished. Measurement value is displayed in the measurement result area.
- ⑤ Repeat the steps from 2 to 4 to start next “Distance” measurement.



**Note:** Maximum 4 measurement values can be displayed in the result window. If more than 4 measurements are made, the 1st result will be replaced by the 5th result.

The unit of the **distance** is “mm”

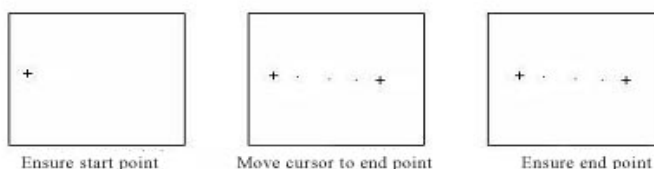


Fig. 7-2 Distance measurement in B mode

### 7.2.2 Circumference and Area---Ellipse method

Measurement steps:

- ① Move the cursor to the menu item-“**CIR/AREA**” in **[B NORMAL MEAS.]** menu, its submenu – “ELLIPSE” and “TRACE” will appear automatically. Move the cursor to “ELLIPSE” menu item of submenu, and press

【SET】 key to select this item. Move the cursor into image area, and the cursor will be displayed as “+”.

Use the trackball to move the cursor to the fixed axis of ellipse measurement area, locate the cursor at the starting point of the fixed axis and press 【SET】 key to fix it, the starting point is displayed as “+”. If press 【CANCEL】 key, it will delete the starting point. Move the cursor to the end point of the fixed axis of ellipse measurement area. There is a dotted line connecting the cursor-“+” to the starting point. Press 【SET】 key to fix the end point, the end point is displayed as “+”. Now the axis of the ellipse area is measured. If press 【CANCEL】 key, it will delete the previous measurement steps.

Move the cursor to adjust the length of another axis of the ellipse, to make displayed ellipse fully covers desired ellipse measurement area. If press 【CANCEL】 key, it will delete the previous measurement steps. When it's just fully covered, press 【SET】 key to confirm the ellipse measurement area, the measurement value will be display in the measurement result area, the current measurement is finished.

② Repeat the steps from 2 to 5 to start next “CIR/AREA” measurement by Ellipse method.



**Note:** Maximum 4 measurement values can be displayed in the result window. If more than 4 measurements are made, the 1st result will be replaced by the 5th result.

The unit of **circumference** and **area** are “mm” and “cm<sup>2</sup>”

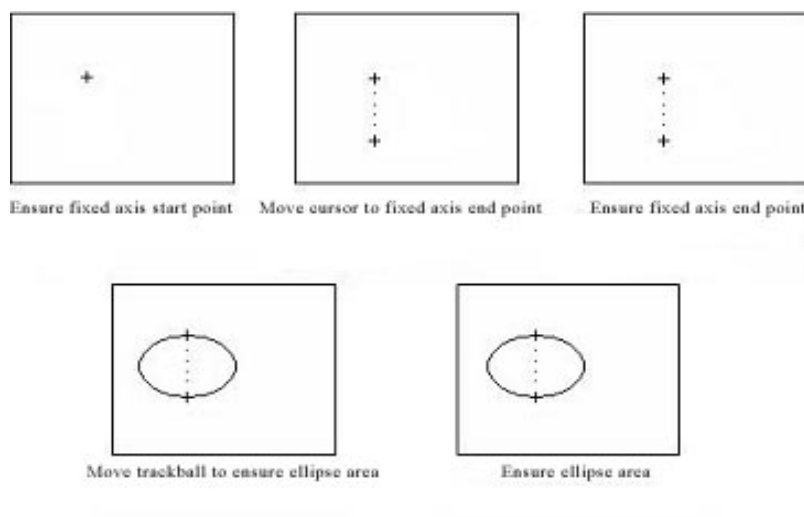


Fig. 7-3 Circumference and Area measurement---Ellipse method

### 7.2.3 Circumference and Area---Tracing method

Measurement steps:

- ① Move the cursor to the menu item-“CIR/AREA” in [B NORMAL MEAS.] menu, its submenu – “ELLIPSE” and “TRACE” will appear automatically. Move the cursor to “TRACE” menu item of submenu, and press 【SET】 key to select this item. Move the cursor into image area, and the cursor will be displayed as “+”.
- ② Move the cursor with the trackball to the starting point of measurement, press 【SET】 key to fix it, the starting point is displayed as “+”. If press 【CANCEL】 key, it will delete the starting point. Use the cursor to draw a trace along the edge of required area, the traced line may not be closed. If press 【CANCEL】 key, it will delete the trace line and starting point.
- ④ Press 【SET】 key, the starting point and end point of trace line will be closed by a straight line, the measurement value will be displayed in the measurement result area, the current measurement is finished.

⑤ Press **【SET】** key to start next “CIR/AREA” measurement by Trace method.



**Note:** Maximum 4 measurement values can be displayed in the result window. If more than 4 measurements are made, the 1st result will be replaced by the 5th result.

The unit of **circumference** and **area** are “mm” and “cm<sup>2</sup>”

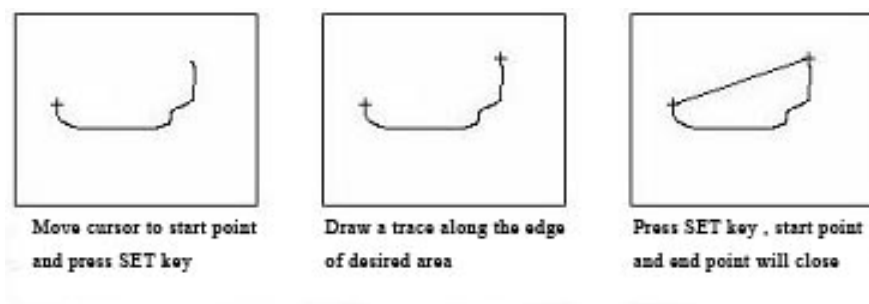


Fig. 7-4 Circumference and Area measurement -Trace method

## 7.2.4 Volume measurement (Two-axis method)

Two-axis method: Vertical section of the target needs to be measured.

◆The formula of Two-axis method:

$$V = (\pi/6) \times A \times B^2 / 1000$$

In the formula, A is the long axis of the ellipse and B is the short axis of the ellipse. The unit of V is ml, the unit of A and B is mm.



The measurement of Volume by Two-axis method is same as the measurement of **CIR/AREA- Ellipse** method

**Note:** 1 measurement value can be displayed in the result window; and the 1st result will be replaced by the 2nd result.

## 7.2.5 Volume measurement (Three-axis method)

Three-axis method: Both the vertical section and the horizontal section of the target need to be measured.

◆The formula of Three-axis method:

$$V = (\pi/6) \times A \times B \times M$$

In the formula, M is the length of the third axis. The unit of V is ml, the unit of A, B, M is cm.

Measurement steps:

- ① In B mode, scan one of the vertical section or the horizontal section of measurement target, freeze the image and press **【MEAS】** key.
- ② Move the cursor to the menu item-“VOLUME” in [B NORMAL MEAS.] menu, its submenu “TWO-AXIS” and “THREE-AXIS” will appear automatically. Move the cursor to “THREE-AXIS” menu item of submenu, and press **【SET】** to select this item. Move the cursor into image area, and the cursor will be displayed as “+”.
- ③ Draw an ellipse which is the similar shape and size as the measurement target area on the screen, so the 2 axis on the first section is measured. The method of drawing an ellipse is the same as how to take area measurement in **CIR/AREA** (Ellipse method), please refer to 7.2.2.
- ④ Defreeze the image, re-scan another section of the target which is perpendicular to the previous image section Then freeze the image and measure the length of the third axis. The method is the same as how to measure the distance.

⑤ After the above measurement, the measured result of the volume is displayed in the measurement result area.

⑥ Press **【SET】** key to start next “Volume” measurement.



**Note:** Maximum 1 measurement value can be displayed in the measurement result area at the right side of the window, if more than 1 measurement is made, the 1st result will be replaced by the 2nd result.

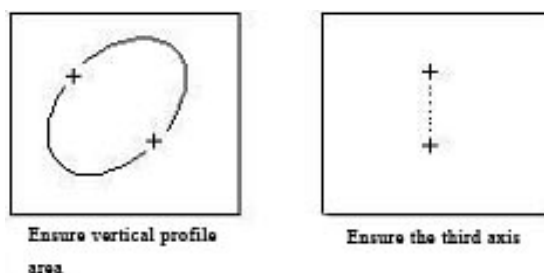


Fig. 7-5 Volume measurement - three-axis method

## 7.2.6 Ratio measurement

Ratio measurement is used to calculate the ratio between two measured distance or area values. The first value is used as the numerator and the second value is used as the denominator.

### 1) Distance

Measurement steps:

- ① Move the cursor to the menu item-“RATIO” in [B NORMAL MEAS.] menu, its submenu will appear automatically and select “Distance”. Move the cursor into image area, and the cursor will be displayed as “+”.
- ② Measure the first distance, and then measure the second one. The method is the same as how to measure “DISTANCE”.
- ③ After the measurements are finished, the final calculated result of ratio will be displayed in the measurement result area.
- ④ Press **【SET】** key to start next “Ratio” measurement.

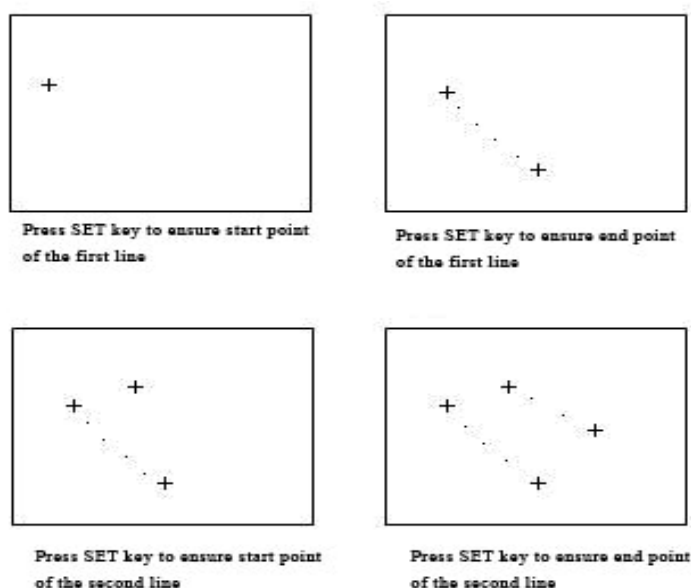


Fig. 7-6 Ratio measurements

**2) Ellipse Area**

Measurement steps:

- ① Move the cursor to the menu item-"RATIO" in [B NORMAL MEAS.] menu, its submenu will appear automatically and select "Ellipse Area". Move the cursor into image area, and the cursor will be displayed as "+".
- ② Measure the first area of ellipse, and then measure the second one. The method is the same as how to measure "CIR/AREA" by using "Ellipse method".
- ③ After the measurements are finished, the final calculated result of ratio will be displayed in the measurement result area.
- ④ Press **【SET】** key to start next "Ratio" measurement.

**3) Trace Area**

Measurement steps:

- ① Move the cursor to the menu item-"RATIO" in [B NORMAL MEAS.] menu, its submenu will appear automatically and select "Trace Area". Move the cursor into image area, and the cursor will be displayed as "+".
- ② Measure the first trace area, and then measure the second one. The method is the same as how to measure "CIR/AREA" by using "Tracing method".
- ③ After the measurements are finished, the final calculated result of ratio will be displayed in the measurement result area.
- ④ Press **【SET】** key to start next "Ratio" measurement.

**Note:**

Maximum 1 measurement value can be displayed in the result window, if more than 1 measurement is made, the 1st result will be replaced by the 2nd result.

**7.2.7 Angle measurement**

Angle measurement is used to measure the angle between two straight lines ( $0\sim 90^\circ$ ).

Measurement steps:

- ① Move the cursor to the menu item-"ANGLE" in [B NORMAL MEAS.] menu, and press **【SET】** key to select this item. Move the cursor into image area, and the cursor will be displayed as "+".
- ② First draw a line along one edge of the angle, then draw a line along another edge of the angle. The method is the same as how to measure distance.
- ③ After the above measurements, the angle between two lines and the length of two lines will be displayed in the measurement result area.
- ④ Press **【SET】** key to start next "Angle" measurement.

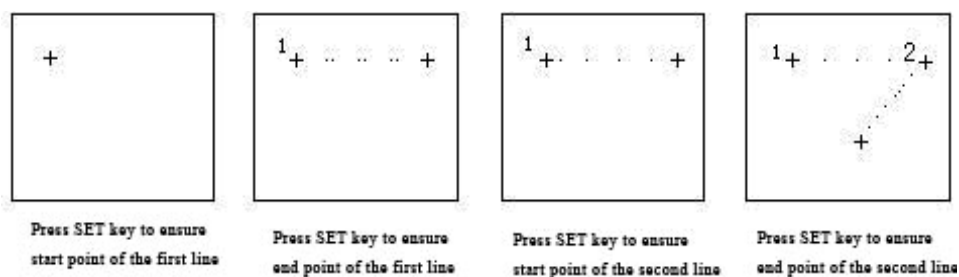


Fig. 7-7 Angle measurements



**Note:** Maximum 1 measurement value can be displayed in the result window, if more than 1 measurement is made, the 1st result will be replaced by the 2nd result.

### 7.2.8 % Stenosis Measurement

% Stenosis measurement is to measure and calculate the stenosis level of the blood vessels. The stenosis distance ratio and the stenosis area ratio will be calculated to determine the stenosis level.

◆The formulae of % stenosis:

Distance % Stenosis=  $((D1-D2) \div D1) \times 100\%$

Area % Stenosis=  $((A1-A2) \div A1) \times 100\%$

In the formula, D1 and A1 represents respectively the distance and area at the non-stenosis position., D2 and A2 represent respectively the distance and area at the stenosis position.

In the formula, the unit of D1, D2 is mm, the unit of A1,A2 is  $\text{cm}^2$

1. Measurement steps for stenosis distance ratio:

- ① Move the cursor to the menu item “%STENOSIS” in [B N ORMAL M EAS.] menu, its submenu “DIS. %STENOSIS” and “AREA%STENOSIS” will appear automatically. Move the cursor to “DIS. %STENOSIS” menu item of submenu, and press **【SET】** to select this item. Move the cursor into image area, and the cursor will be displayed as “+”
- ② Measure the distance D1 at the non-stenosis position. The method is the same as how to measure distance.
- ③ Measure the distance D2 at the stenosis position. The method is the same as how to measure distance. After the measurements, the final calculated result of the stenosis distance ratio is displayed in the measurement result area.
- ④ Press **【SET】** key to start a new measurement.

2. Measurement steps for stenosis area ratio:

- ① Move the cursor to the menu item “%STENOSIS” in [B N ORMAL M EAS.] menu, its submenu “DIS. %STENOSIS” and “AR EA%STENOSIS” will appear automatically. Move the cursor to “AR EA %STENOSIS” menu item of submenu, and press **【SET】** to select this item. Move the cursor into image area, the cursor will be displayed as “+”
- ② Measure the area A1 at the non-stenosis position and the area A2 at the stenosis position. The method is the same as measurement in “CIR/AREA”(Ellipse method).
- ③ After the measurements, the calculated value of the stenosis area ratio is displayed in the measurement result area.
- ④ Press **【SET】** key to start a new measurement.



**Note:** Maximum 1 measurement value can be displayed in the result window, if more than 1 measurement is made, the 1st result will be replaced by the 2nd result.

### 7.2.9 Histogram

Histogram is used to calculate the gray distribution of the ultrasound echo signals within a specified area. Use the rectangle, ellipse or trace method to draw along the desired measurement area. The result is shown in the form of

histogram.

Histogram can be measured only on the frozen image.

◆ Measurement steps by rectangular method:

- ① Press **【FREEZE】** key to freeze the image.
- ② Move the cursor to the menu item-“HISTOGRAM” in [B NORMAL MEAS.] menu, its submenu “RECTANGULAR”, “ELLIPSE” and “TRACE” will appear automatically. Move the cursor to “RECTANGULAR” menu item of submenu, and press **【SET】** to select this item. Move the cursor into image area, and the cursor will be displayed as “+”
- ③ Move the cursor to the apex of the rectangle, and press **【SET】** key to fix it.
- ④ Move the cursor to fix the diagonal point of the rectangle and fix the measurement area of the diagram. The calculated result of the histogram will be displayed at the centre of the screen. To close the dialog box-“Histogram”, please press **【SET】** key on ‘OK’ button or **「×」** at top right corner of the dialog box.
- ⑤ Repeat the steps from 3 to 4 to start a new measurement.

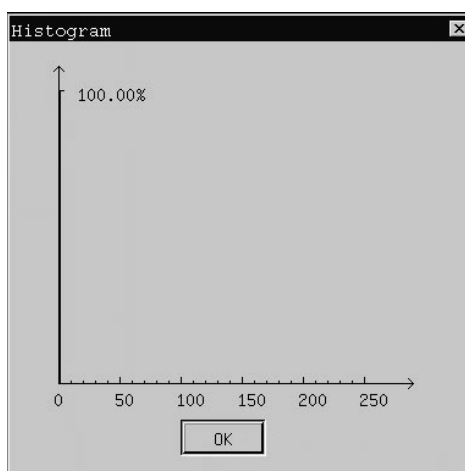


Fig.7-8 Measurement value for Histogram

◆ Measure the histogram by ellipse or trace method: The method is the same as that to measure “CIR/AREA” by ellipse or trace method.

The measured result of the histogram is shown as in Fig. 7-8:

- 1- The horizontal axis represents the gray scale of the image ranging from 0 to 255.
- 2- The vertical axis represents the distribution ratio of each gray scale. The value shown on the top of vertical axis represents the percentage of the maximally distributed gray in the whole gray distribution.

## 7.2.10 Profile

Profile is used to measure the gray distribution of the ultrasound signals in the vertical or horizontal direction on a certain profile (section).

This measurement is only available in the frozen mode.

Measurement steps:

- ① Press **【FREEZE】** to freeze the image.
- ② Move the cursor to menu-item-“PROFILE” in [B NORMAL MEAS.] menu and press the **【SET】** key to select it. Move the cursor into image area, and the cursor will be displayed as “+”.
- ③ Draw a straight line at the measuring position. The method is the same as that to measure distance.
- ③ The calculated result of the profile will be displayed at the centre of the screen. To close the dialog box- “Profile”,

please press **【SET】** key on 'OK' button or **「×」** at top right corner of the dialog box.

- ④ Repeat the steps from 3 to 4 to start a new measurement.

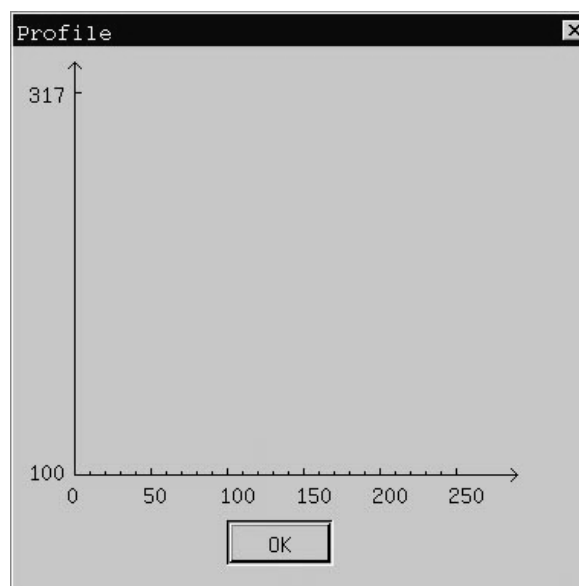


Fig. 7-9 Measurement value for Profile

The measured result of the profile is shown as in Fig. 7-9:

- 1-The horizontal (or vertical) axis represents the projection of the profile line on the horizontal direction.
- 2-The vertical (or horizontal) axis represents the gray distribution of the corresponding points on the profile line. The range is 0 to 255.

## 7.3 Normal measurement and calculation in M, B/M mode

At real-time status, press **【B/M】** mode key twice to enter M mode, [M IMAGE MENU] will appear automatically at the right of the screen, press **【MEAS】** key to enter into M mode measurement status.

**OR**

Press **【B/M】** mode key to enter the B/M mode, [B/M IMAGE MENU] will appear automatically at the left bottom of the screen, *the test result will appear from down to up in turn* press **【MEAS】** key to enter into M mode measurement status. (If press **【CTRL】** + **【B】**, it will shift to B mode measurement status)



Note: In B/M mode, press **【CTRL】** + **【B】** to shift measurement between on B image area and on M image area. Measurement on B image area is the same as to measurement and calculation in B, B/B and 4B mode.

### 7.3.1 Distance



**Note:** If no measurement item is selected, the default measurement is "DISTANCE", press **【SET】** key to start "Distance" measurement.



M BASIC MEAS.
DISTANCE
TIME
VELOCITY
HEART RATE
M CAR MEASURE

Fig. 7-10 M normal measurement menu

Measurement steps:

- ① Move the cursor to the menu item-“DISTANCE” in [M BASIC MEAS.] menu. Press **【SET】** key to enter into “Distance” measurement. Move the cursor into image area, and the cursor will be displayed as “+”.

Use the trackball to move the cursor to the starting point, press **【SET】** key to fix it, the starting point is displayed as “-”. It will display one vertical dotted line and also one horizontal line. The horizontal will move along with the cursor. If press **【CANCEL】** key, it will delete the dotted line, horizontal line and the starting point.

- ② Move the cursor with the trackball to the end point and press **【SET】** key to fix it, the end point is display as “-”. Between the starting point and end point, the primary vertical dotted line becomes a vertical solid line. The current measurement is finished, and the measurement value will be displayed in the measurement result area.
- ③ Repeat the steps from 2 to 3 to start next “Distance” measurement.



**Note:**

1. The starting point and end point can be exchanged by pressing [SPACE] button on the keyboard.
2. The measurement result area can display maximum 4 measurement values in the result window, if more than 4 measurements are made, the 1st result will be replaced by the 5th result.

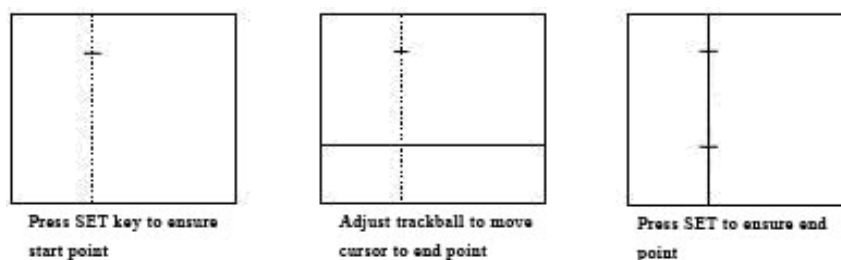


Fig. 7-11 Distance measurement in M mode

### 7.3.2 Time

Measurement steps:

- ① Move the cursor to the menu item- “TIME” in [M BASIC MEAS.] menu. Press **【SET】** key to enter into time measurement. Move the cursor into image area, and the cursor will be displayed as “+”.

Move the cursor with the trackball to the starting point, press **【SET】** key to fix the starting point and it will display one vertical dotted line on the starting point. When moving the trackball, one vertical solid line will appear and move along with the cursor. If press **【CANCEL】** key, it will delete the vertical solid line and vertical dotted line on the starting point.

Move the cursor to the end point and press **【SET】** key to fix it, it will display a vertical dotted line on the end point. If press **【CANCEL】** key, it will delete both the vertical dotted lines on the end point and starting point. The current measurement is finished, and the measurement value will be displayed in the measurement result area.

- ② Repeat the steps from 2 to 4 to start next “Time” measurement.

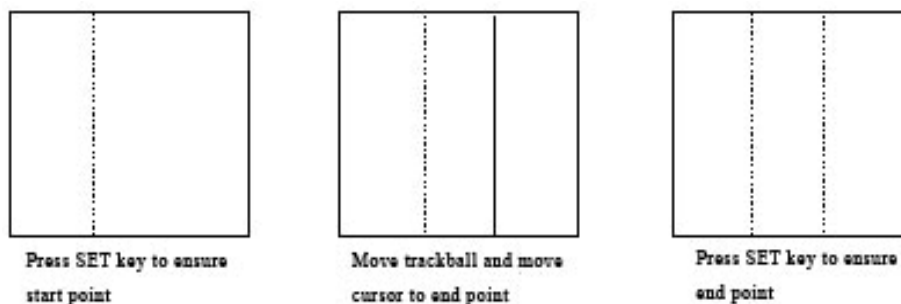


Fig. 7-12 Time measurement in M mode



Note: There are 4 measurement values to show in the result window. If more than 4 measurements are performed, the 1st measurement value will be replaced by the 5th measurement value in the result window.

### 7.3.3 Velocity

Measurement steps:

- ① Move the cursor to the menu item- “VELOCITY” in [M BASIC MEAS.] menu. Press **【SET】** key to enter into velocity measurement. Move the cursor into image area, and the cursor will be displayed as “+”
- ② Move the cursor to the starting point, press **【SET】** key to fix the starting point.

Use the trackball to move the cursor-“+” to the end point. There is a dotted line connecting the cursor to the starting point “+”, and the cursor is displayed as the reticle. If press **【CANCEL】**key, it will delete the dotted line and starting point. Move the cursor to the end point and press **【SET】** key to fix it, the end point is displayed as “+”. The current measurement is finished, and the measurement value will be displayed in the measurement result area .

- ③ Repeat the steps from 2 to 4 to start next “Velocity” measurement.



**Note:** The measurement result area can display maximum 4 measurement values at the right side of the window, if more than 4 measurements are made, the 1st result will be replaced by the 5<sup>th</sup> result.

### 7.3.4 Heart rate

Heart rate is used to calculate the number of heart beats per minute from cardiac image.

Measurement steps:

- ① Move the cursor to the menu item- “HEART RATE” in [M BASIC MEAS.] menu. Press **【SET】** key to enter into heart rate measurement. Move the cursor into image area, and the cursor will be displayed as “+”.
- ② The measurement steps are the same as “Time” measurement in M mode.
- ③ After the above measurement, the calculated heart rate result is displayed in the measurement result area.



**Caution:** To get the result of heart rate, you need to measure 2 cardiac cycles.



**Note:** There are 4 measurement values to show in right results window. If more than 4 measurements are performed, the 1st measurement value will be replaced by the 5<sup>th</sup> measurement value in the result window.

## 7.4 OB/GYN measurement and calculation

Normally OB/GYN measurement and calculation (for small animal) are performed in B mode image. Press **【OB/GYN】** key to enter into OB/GYN exam mode. Freeze the required image, then press **【MEAS】** key to enter into OB/GYN measurement status. When press **【MEAS】** key, [ANIMAL SPECIES] menu appears for animal category selection, then select relevant species and enter into measurement status.

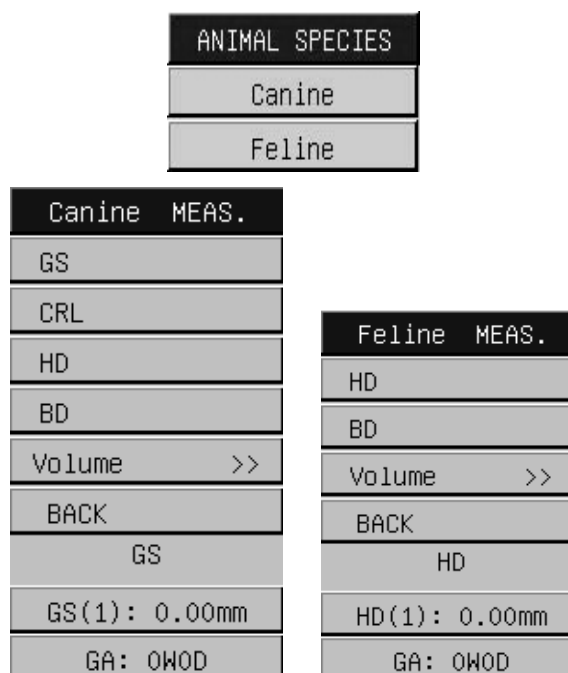


Fig. 7-13 OB/GYN measurement menu

There are two submenus under [ANIMAL SPECIES] main menu: [Canine MEAS.] menu and [Feline MEAS.] menu.

### 7.4.1 Fetal growth measurement-Canine

The parameters given as below are general indexes used to evaluate Canine's fetal growth.

GS-Gestation Sac Diameter

CRL- Crown Rump Length

HD- Head Diameter

BD- Body Diameter

After measuring each parameter, the system will automatically calculate the GA based on the measured results.

Take GS measurement of Canine for example:

Measurement steps:

- ① Move the cursor to menu item-“Canine” in [ANIMAL SPECIES] menu, press **【SET】** key to select it.  
[Canine MEAS.] submenu appears.
- ② Move the cursor to menu item-“GS” in [Canine MEAS.] menu, and press **【SET】** key to select it. Move the cursor into the image area.
- ② Do GS measurement, the method is the same as “Distance” measurement in B mode, please refer to “Distance” measurement in 7.2.1.
- ③ After the above measurement, the result of measured GS and GA will be displayed in the measurement result area.
- ④ Press **【SET】** key to start next “GS” measurement.

For CRL, HD and BD, the measurement method is the same as GS.



**Note:** Maximum 1 measurement value can be displayed in the result window, if more than 1 measurement is made, the 1st result will be replaced by the 2nd result.

## 7.4.2 Fetal growth measurement-Feline

The parameters given as below are general indexes used to evaluate Feline’s fetal growth.

HD- Head Diameter

BD- Body Diameter

The measurement method of HD and BD is the same as “GS” measurement of Canine, please refer to 7.4.1.

## 7.4.3 Volume measurement-Canine, Feline

[Volume] measurement menu is used to measure Normal volume, Bladder volume or Thyroid volume.

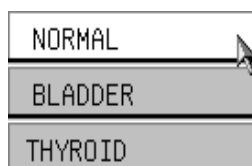


Fig. 7-14 V olume measurement menu

Take Bladder volume measurement of Canine for example:

Measurement steps:

- i. Move the cursor to menu item-“Volume” in [Canine MEAS.] menu, and press **【SET】** key to select it. Move the cursor into the image area.
- ii. Do the measurement of length, width and height one by one.
- iii. After the above measurement, the result of bladder volume will be displayed in the measurement result area.

The measurement of Normal volume and Thyroid volume is the same as “Bladder volume” measurement.

**Formulae:**

Normal volume = (distance 1 × distance 2 × distance 3 × 0.5233) / 1000

Bladder volume = (distance 1 × distance 2 × distance 3 × 0.5233) / 1000

Thyroid volume = (distance 1 × distance 2 × distance 3 × 0.2083) / 1000

In the above formulae, the unit of distance 1, distance 2 and distance 3 is mm, the unit of volume is ml.

## 7.5 Small parts measurement and calculation

The measurement and calculation methods are the same as the Normal measurement and calculation in B, B/B and 4B mode, please refer to 7.2

## 7.6 Reproduction measurement and calculation

Normally Reproduction measurement and calculation (for large animal) are performed in B mode image. Press **【REPRO.】** key to enter into Reproduction exam mode. Freeze the desired image, then press **【MEAS】** key to enter into Reproduction measurement status. When press **【MEAS】** key, [ANIMAL SPECIES] menu appears for animal category selection, then select relevant species and enter into measurement status.

ANIMAL SPECIES		
Bovine		
Equine		
Ovine		

Bovine MEAS.		Ovine MEAS.
BPD		BPD
CRL		CRL
T.D.		T.D.
Volume >>		Volume >>
BACK		BACK
BPD		BPD
BPD(1): 0.00mm		BPD(1): 0.00mm
GA: 0W0D		GA: 0W0D

Equine MEAS.
GS
Volume >>
BACK
GS
GS(1): 0.00mm
GA: 0W0D

Fig. 7-15 Reproduction measurement menu

There are three submenus under [ANIMAL SPECIES] main menu: [Bovine MEAS.] menu, [Equine MEAS.] menu and [Ovine MEAS.] menu.

### 7.6.1 Reproduction measurement-Bovine

The parameters given as below are general indexes used to evaluate Bovine's reproduction.

BPD- Biparietal Diameter

CRL- Crown Rump Length

T.D.- Trunk Diameter

The measurement method of BPD, CRL and T.D. are the same as "GS" measurement of Canine, please refer to 7.4.1.

### 7.6.2 Reproduction measurement-Equine

The parameters given as below are general indexes used to evaluate Equine's reproduction.

GS-Gestation Sac Diameter

The measurement method of GS is the same as "GS" measurement of Canine, please refer to 7.4.1.



**Note:** When  $25\text{mm} \leq \text{GS} < 26\text{mm}$ , Equine Gestational Age is not certain as its fetal growth is very slow at this time which takes about 10 days according to the relevant statistic data.

### 7.6.3 Reproduction measurement-Ovine

The parameters given as below are general indexes used to evaluate Ovine's reproduction.

BPD- Biparietal Diameter

CRL- Crown Rump Length

T.D.- Trunk Diameter

The measurement method of BPD, CRL and T.D. are the same as "GS" measurement of Canine, please refer to 7.4.1.

### 7.6.4 Volume measurement-Bovine, Equine and Ovine

The volume measurement method for Bovine, Equine and Ovine is the same as "Volume measurement-Canine, Feline", please refer to 7.4.3.


## 7.7 Cardiology measurement and calculation

Cardiology examination measurement is normally performed in M mode or B/M mode.


### 7.7.1 Measurement in M mode

At real-time status, press **【B/M】** mode key twice to enter M mode, [M IMAGE MENU] will appear automatically at the right of the screen, press **【MEAS】** key and select menu item-"M CAR MEASURE" in [M BASIC MEAS.] to enter into M mode cardiology measurement status.

**OR**

Press [B/M] to enter the B/M mode, [B/M IMAGE MENU] will appear automatically at the right of the screen, press **【MEAS】** key and select menu item-“M CAR MEASURE” in [M BASIC MEAS.] to enter into M mode cardiology measurement status. (If press **【CTRL】** +  again, it will shift to B mode measurement status)



**Note:** In B/M mode, press **【CTRL】** +  to shift measurement between on B image area and on M image area. Measurement on B image area is the same as to measurement and calculation in B, B/B and 4B mode.

M CAR. MEAS.
DISTANCE
HEART RATE
EJECTION TIME
INPUT >>
LV FUNCTION >>
MITRAL VALVE >>
AORTIC VALVE >>
M BASIC MEAS.

Fig. 7-16 Cardiac measurement menu in M mode

#### 7.7.1.1 Distance

Same as “Distance” measurement in M mode.

#### 7.7.1.2 Heart rate

Same as “Heart rate” measurement in M mode

#### 7.7.1.3 Ejection time

Same as “Time” measurement in M mode

#### 7.7.1.4 Input

The value of Heart rate, Ejection time, height and weight may be input directly through keyboard by “Input” function. After the value of height and weight is input, the result of BSA will appear in the measurement result area.

Formula:  $BSA = 0.0061 \times \text{Height} + 0.0128 \times \text{Weight} - 0.1529$

BSA : Body surface area

In the formulae, the unit of BSA is  $m^2$ , the unit of Height is cm, the unit of Weight is kg.

### 7.7.1.5 Left ventricular function

Left ventricular measurement in M mode is performed by measuring Left ventricular short axis diameter both at end diastole and at end systole. After Left ventricular measurement, the relevant parameters including SV (Stroke volume), EF (Ejection fraction), SF (Shortening fraction) will be calculated and displayed on the screen automatically. If other operations are performed before Left ventricular measurement, such as measuring or inputting heart rate and ejection time, inputting height and weight, the parameters of CO, CI, SI, LVMW and MVCF will be calculated and displayed on the screen after Left ventricular measurement.

#### Left ventricular measurement Formula:

$$EDV = 7.0 \times LVIDd^3 / (LVIDd + 2.4)$$

$$ESV = 7.0 \times LVIDs^3 / (LVIDs + 2.4)$$

$$SV = |EDV - ESV|$$

$$EF = SV / EDV \times 100\%$$

$$SF = (LVIDd - LVIDs) / LVIDd \times 100\%$$

EDV: End-diastolic left ventricular volume

ESV: End-systolic left ventricular volume

LVIDd: Left ventricular short axis diameter at end diastole

LVIDs: Left ventricular short axis diameter at end systole

SV: Stroke volume

EF: Ejection fraction

SF: Shortening fraction

In the above formulae:

The unit of EDV and ESV is ml, the unit of LVIDd and LVIDs is cm,

the unit of SV is ml, the unit of EF and SF is %, the unit of CO is l/min, the unit of HR is bpm.

Measurement steps:

- ① Move the cursor to menu item-“LV FUNCTION” in [M CAR. MEAS.] menu, the submenu of “LV FUNCTION” appears.
- ② Move the cursor to menu item- “LVIDd” in [LV FUNCTION] submenu and press **【SET】** key to select it. Measure the item LVIDd at end of left ventricular diastole, the measurement method is the same as “Distance” measurement in M mode.
- ③ Move the cursor to menu item- “LVIDs” in [LV FUNCTION] submenu and press **【SET】** key to select it. Measure the item LVIDs at end of left ventricular systole, the measurement method is the same as “Distance” measurement in M mode.
- ④ After the above measurements, the calculated value of EDV, ESV, SV, EF, SF will be displayed in the measurement area.



**Note:** There is maximum 1 measurement value shown in the result window. The next measurement value will replace the previous result automatically and will be displayed in the result window.



### 7.7.1.6 Calculating CO (Cardiac Output)

After Left ventricular measurement, the system can calculate CO on the basis of the measured heart rate or input heart rate.

Formula:  $CO = SV \times HR / 1000$

HR: heart rate

In the formula, the unit of CO is l/min, the unit of SV is ml, the unit of HR is bpm.

Calculating CO by measuring heart rate:

1. Move the cursor to menu item-“HEART RATE” in [M CAR. MEAS.] menu, and press 【SET】 key to select it.
2. Measure “Heart rate”, the measurement method is the same as “Heart rate” measurement in M mode.
3. Select menu item-“LV FUNCTION” and make Left ventricular measurement, please refer to 7.7.1.5.
4. After the above measurement, the result of CO will be displayed in the measurement result area.

Calculating CO by inputting heart rate:

1. Move the cursor to menu item-“INPUT” in [M CAR. MEAS.] menu, its submenu appears automatically. Select menu item- “HEART RATE” in the submenu, press 【SET】 key to input Heart rate.
2. A dialog box –“Input heart rate” appears as below, input the value of heart rate.

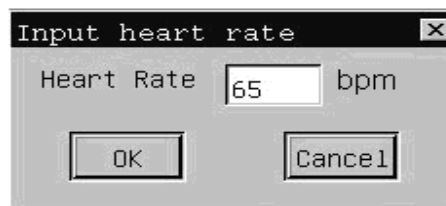


Fig.. 7-17 Dialog box for heart rate input

3. Move the cursor to “OK” button and press 【SET】 key to confirm the input value and exit. If you press 【SET】 key on “Cancel” button or 「×」 button at top right corner of the dialog box, it will exit from input status without saving the input value.
4. Select menu item-“LV FUNCTION” and make Left ventricular measurement, please refer to 7.7.1.5.
5. After the above operation, the result of CO will be displayed in the measurement result area.

### 7.7.1.7 Calculating MVCF (Mean velocity of circumferential fiber shortening)

After Left ventricular measurement, the system can calculate MVCF on the basis of the measured ejection time or input ejection time.

Formula:  $MVCF = (LVIDd - LVIDs) / (LVIDd \times LVET)$

LVET: Ejection time

In the formula: the unit of LVIDd, LVIDs is mm, the unit of LVET is s.

Calculating MVCF by measuring heart rate:

1. Move the cursor to menu item-“EJECTION TIME” in [M CAR. MEAS.] menu, and press 【SET】 key to select it.

2. Measure “Ejection time”, the measurement method is the same as “Time” measurement in M mode.
3. Select menu item-“LV FUNCTION” and make Left ventricular measurement, please refer to 7.7.1.5.
4. After the above measurement, the result of MVCF will be displayed in the measurement result area.

Calculating MVCF by inputting ejection time:

1. Move the cursor to menu item-“INPUT” in [M CAR. MEAS.] menu, its submenu appears automatically. Select menu item- “HEART RATE” in the submenu, press 【SET】 key to input Ejection time.
2. A dialog box-“Input Ejection time” appears, input the value of Ejection time .
3. Move the cursor to “OK” button and press 【SET】 key to confirm the input value and exit, the Ejection time value and MVCF result will appear in the measurement result area. If you press 【SET】 key on “Cancel” button or 「×」 button at top right corner of the dialog box, it will exit from input status without saving the input value.

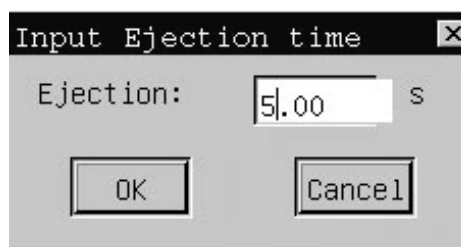


Fig.. 7-18 Dialog box for Ejection time input

4. Select menu item-“LV FUNCTION” and make Left ventricular measurement, please refer to 7.7.1.5.
5. After the above operation, the result of MVCF will be displayed in the measurement result area.

### 7.7.1.8 LVMW (Left Ventricle Muscle Weight)

After Left ventricular measurement, the system can calculate LVMW on the basis of the measured IVSd, LVIDd, and LVPWd.

Formula:  $LVMW = 1.04 \times [(IVSd + LVIDd + LVPWd)^3 - LVIDd^3] - 13.6$

IVSd: Inter-ventricular septum thickness at end diastole

LVPWd: Left ventricular posterior wall thickness at end diastole

In the formula: the unit of LVMW is g, the unit of IVSd, LVIDd, LVPWd is cm.

Measurement steps:

- ① Select menu item-“LV FUNCTION” and make Left ventricular measurement, please refer to 7.7.1.5.
- ② Measure LVPWd and IVSd one by one, the measurement method is the same as “Distance” measurement in M mode.
- ③ After the above measurements are finished, the result of LVMW will be displayed in the measurement result area.

### 7.7.1.9 Calculating CI, SI

After left ventricular measurement and CO measurement , the system can calculate CI, SI on the basis of the input value of height and weight.

Formulae:

$CI = CO / BSA$

$SI = SV / BSA$

CI: CO index

SI: SV index

In the above formulae, the unit of CO is l/min, the unit of SV is ml, the unit of BSA is  $m^2$ , the unit of Height is cm, CI, and SI has no unit.

Calculating CI and SI by inputting height and weight:

1. Move the cursor to menu item- "INPUT" in [MCA R. MEAS.] menu, the submenu of "INPUT" appears automatically.
2. Move the cursor to menu item-"HEIGHT WEIGHT" in the submenu, press **【SET】** key, a dialog box-"Input Height, Weight" appears, input the value of height and weight.
3. Move the cursor to "OK" button and press **【SET】** key to confirm the input value and exit. If you press **【SET】** key on "Cancel" button or **「×」** button at top right corner of the dialog box, it will exit from input status without saving the input value.
4. Select menu item-"LV FUNCTION" and make Left ventricular measurement, please refer to 7.7.1.5.
5. After the above operation, the result of CI and SI will be displayed in the measurement result area.

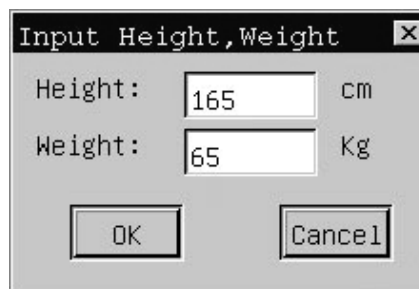


Fig. 7-19 Dialog box for Height and weight input

#### 7.7.1.10 Mitral valve measurement

Mitral Valve measurement includes the following items:

EF Speed: Mitral valve closing speed

AC Speed: AC descending speed

A/E: Amplitude of the A wave / Amplitude of the A wave

QMV: Mitral valve volume

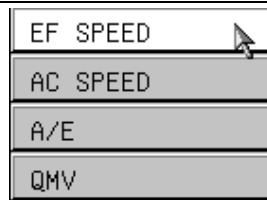


Fig. 7-20 Mitral valve measurement submenu

- A. Measurement method of EF Speed: same as “Velocity” measurement in M mode
- B. Measurement method of AC Speed: same as “Velocity” measurement in M mode.
- C. Measurement method of A/E is the same as “Distance” measurement in M mode.

D. Measure method of QMV (Mitral valve volume)

Formula:  $QMV = 4 \times DEV \times DCT$

In the above formula:

DEV represents the Mitral valve opening speed

DCT represents the Mitral valve opening time.

The unit of QMV is ml, the unit of DEV is cm/s, the unit of DCT is s.

- ① Move the cursor to menu item-“QMV” in Mitral valve measurement submenu, and press **【SET】** to select it. The cursor is displayed as “+”.
- ② Do the measurement of DEV first, the measurement method is the same as “Velocity” measurement in M mode.
- ③ Then do the measurement of DCT, the measurement method is the same as “Time” measurement in M mode.
- ④ After the above measurements are finished, the result of Mitral valve volume will appear in the measurement result area.
- ⑤ Press **【SET】** key to start a new measurement.



**Note:** Maximum 1 measurement value can be displayed in the result window, if more than 1 measurement is made, the 1st result will be replaced by the 2nd result

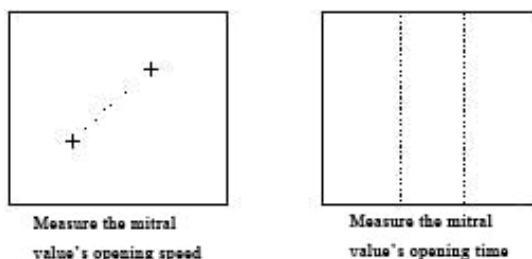


Fig. 7-21 Mitral valve volume measurement

### 7.7.1.11 Aortic valve measurement

Aortic valve measurement includes the following items:

LAD: The diameter of the left atrium

AOD: The diameter of the aorta

LAD/AOD: Ratio of left atrium to aorta

AVSV: Aortic valve volume

#### A. Measurement steps -LAD/AOD:

- ① Move the cursor to menu item-"LAD/AOD" in Aortic valve measurement submenu, and press **【SET】** to select it.
- ② Do the measurement of LAD and AOD respectively, the measurement method is the same as "Distance" measurement in M mode.
- ③ After the above measurements are finished, the result of LAD/AOD will appear in the measurement result area.



**Note:** Maximum 1 measurement value can be displayed in the result window, if more than 1 measurement is made, the 1st result will be replaced by the 2nd result.

#### B. Measurement steps -Aorta valve volume (AVSV).

Formula:  $AVSV = (MAVO1 + MAVO2) \times LVET \times 50 + AA$

In the formula:

MAVO1: The opening diameter of the aorta valve at the beginning.

MAVO2: The opening diameter of the aorta valve at the end.

AA: The amplitude of the aorta posterior wall

The unit of AVSV is ml, the unit of MAVO1, MAVO2 and AA is cm, the unit of LVET is s.

Measurement steps:

- ① Move the cursor to menu item-"AVSV" in Aortic valve measurement submenu, and press **【SET】** key to select it.
- ② Measure MAVO1 and MAVO2, the measure method is the same "Distance" measurement in M mode.

- ③ Do the measurement of LVET, the measurement method is the same as “Time” measurement in M mode.
- ④ Do the measurement of AA, the measure method is the same “Distance” measurement in M mode.
- ⑤ After the above measurements are finished, the value of Aorta valve volume will appear in the measurement result area.



**Note:** Maximum 1 measurement value can be displayed in the result window, if more than 1 measurement is made, the 1st result will be replaced by the 2nd result.

## 7.7.2 Measurement in B mode

In B/M mode, it's easy to get a two-dimensional cardiology movement graph at the end of cardiac systole and diastole cycle. And the measurement result is relatively more accurate.

How to enter into Left ventricular measurement in B mode:

In B/M mode, freeze the desired image, press **【MEAS】** key, move the cursor to menu item-“OTHERS” and its submenu appears. Move the cursor to menu item-“B CAR MEASURE” in the submenu and press select **【SET】** key to enter into Left ventricular measurement..

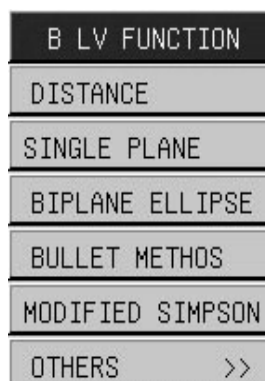


Fig.. 7-22 Cardiac measurement menu in B mode

### 7.7.2.1 Distance

Refer to “Distance” measurement in B mode.

### 7.7.2.2 Left ventricular measurement

Left ventricular measurement on B mode image is performed on the basis of the calculated result of both left ventricular systolic volume and left ventricular diastolic volume. However, when use different formula, the parameters to be measured are different.

There are four formulae available for calculating left ventricular volume in B mode.

◆ Single-plane Ellipse formula:

Measure on the long axis section of left ventricular (cardiac apex two-chamber or four-chamber section). The left ventricular volume is calculated based on the formula below:

$$V = (\pi/6) \times L \times D^2 / 1000$$

In the above formula:

L represents the long axis diameter of left ventricular.

D represents the short axis diameter of left ventricular.

The unit of V is ml, the unit of L and D is mm.

◆ Bi-plane Ellipse formula:

After obtaining the horizontal short axis section of mitral valve and cardiac apex two-chamber section, or cardiac apex four-chamber section, the system calculates the left ventricular volume based on the formula below:

$$V = (8/3) \times A_m \times A_i / (\pi \times D)$$

In the above formula:

D represents the short axis diameter of left ventricular

A<sub>m</sub> represents the left ventricular area of the horizontal section of mitral valve

A<sub>i</sub> represents the left ventricular area of the apex chamber section.

The unit of V is ml, the unit of A<sub>m</sub> and A<sub>i</sub> is cm<sup>2</sup>, the unit of D is cm.

◆ Bullet volume formula

After obtaining the short axis section of mitral valve, and cardiac apex two-chamber or four-chamber section, you can calculate the left ventricular volume based on the formula below:

$$V = (5/6) \times A_m \times L$$

In the above formula:

A<sub>m</sub> represents the left ventricular area of the horizontal section mitral valve.

L represents the long axis diameter of left ventricular.

The unit of V is ml, the unit of A<sub>m</sub> is cm<sup>2</sup>, the unit of L is cm.

◆ Modified SIMPSON formula:

$$V = (A_m/2 + 5 \times A_p/18) \times L$$

In the above formula:

A<sub>m</sub> represents short axis area of left ventricular of the horizontal section mitral valve.

A<sub>p</sub> represents short axis area of left ventricular at the horizontal section of papillary muscle.

L represents the long axis diameter of left ventricular.

The unit of V is ml, the unit of A<sub>m</sub> and A<sub>p</sub> is cm<sup>2</sup>, the unit of L is cm.

Take Single-plane Ellipse formula for example:

- ① Move the cursor to menu item-“SINGLE PLANE” in [B LV FUNCTION] menu, press **【SET】** key to select it.

- ② At the left ventricular end systole, respectively measure the following parameters:
- Long axis diameter SL. The method is the same as “Distance” measurement in B mode.
- Short axis diameter SD. The method is the same as “Distance” measurement in B mode.
- ③ At the left ventricular end diastole, respectively measure following parameters.
- Long axis diameter DL. The method is the same as “Distance” measurement in B mode
- Short axis diameter DD. The method is the same as “Distance” measurement in B mode.
- ④ After the above measurements, the result of EDV(End-diastolic left ventricular volume) and ESV( End-systolic left ventricular volume) will be displayed in the measurement result area, and the value of SV and EF value will be calculated and displayed at the same time.

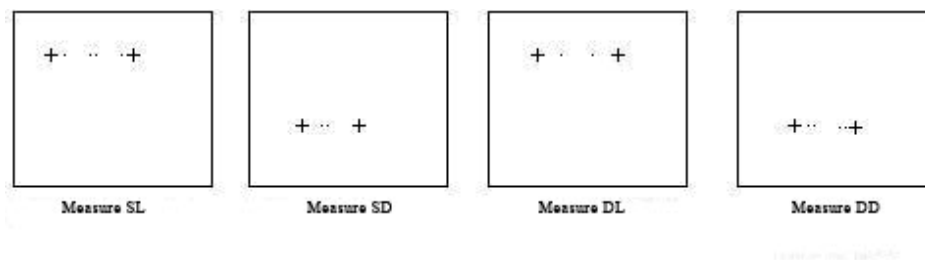


Fig. 7-23 LV measurement by Single-plane Ellipse method



## Chapter 8 Cine-Memory

This chapter introduces the theory of saving images in Cine-memory and the operation of image playback in Cine-memory.

### 8.1 Store the real-time image

At real time status, images in B-mode can be stored in Cine-memory at the unit of frame in time sequence. If the storage is full of images, when storing a latest new frame image, the first saved frame image will be removed out of Cine-memory. Therefore there are always the latest images in the storage. All the images in Cine-memory can be played back manually or automatically.

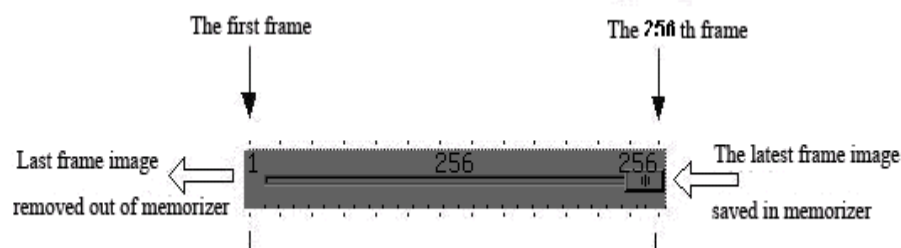


Fig. 8-1 Indicator of playback of Cine memory

### 8.2 Manual playback

The default playback method of Cine memory is manual playback.

Press **【FREEZE】** key to freeze the image at real-time status. Then press **【CINE】** key to enter into Cine-memory function, the **【CINE】** key will get back-lit and [B Freeze MENU] appears (please refer to Fig. 8-2). The system will enter into manual playback status.

Turn the track ball forward or backward to review the images stored in Cine-memory. If turn the trackball to the right, the images will be displayed at the increasing sequence of Frame No., which means the sequence of playback is same as the sequence of saving these images. If turn the trackball to the left, the images will be displayed at the decreasing sequence of Frame No.



Fig. 8-2 B Freeze MENU in B mode

When the system enters into Cine-memory function, the indicator of Cine-memory will appear at the bottom of the image area, indicating the frame No. of playback and the total frames. Please refer to the Figure as follows:

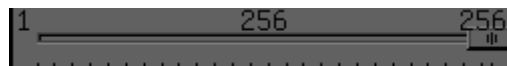


Fig. 8-3 Indicator of Cine-memory

During manual playback status, press **【CINE】** key and the **【CINE】** key will become dark, then the system exit from the manual playback status.

### 8.3 Automatic playback

During the manual playback status, press **【CINE】** to exit. Move the cursor to **[PLAY / STOP]** in the B Freeze MENU, turn the **【MULTI】** knob clockwise (i.e. switch “STOP” to “PLAY”) to start the automatic playback function, at this time the images stored in Cine-memory will be displayed at the increasing sequence of Frame No.. When turn the knob anticlockwise (i.e. switch “PLAY” to “STOP”), the system will stop automatic playback function.

Before or during automatic playback status, the speed of automatic playback can be changed through **[PLAY SPEED]** in the B Freeze MENU by turning the **【MULTI】** knob. The current speed shows at the right of the menu option, the range of playback speed is from 1 to 4.

## Chapter 9 Annotation

### 9.1 Introduction

Annotation function allows users to add comments by inputting the characters or symbols on the image.

#### Enter into annotation status:

Press **【COMMENT】** key to enter into annotation status and **【COMMENT】** key will get back-lit

Move the cursor with the trackball to the desired annotation position on the image, press **【SET】** key, a blank frame appears and the cursor changes as twinkling “|”, which means the operator is allowed to input comments.



Fig. 9-1 COMMENT key

**Exit from annotation status:** At the annotation status, press **【COMMENT】** key to exit from annotation function and the **【COMMENT】** key will become dark.

Annotation can be made by inputting characters from the keyboard or recalling the terms saved in annotation database. The annotation database of the system is classified as following according to examination mode:

Classification	Function description
Abdomen	Anatomy terms for Abdomen or general examination
OB	Anatomy terms for Obstetrics
Gynecologist	Anatomy terms for Gynecology
Cardiac	Anatomy terms for Cardiology
Small parts	Anatomy terms for Small parts
Pathological change	Normal terms for pathological change of Abdomen, OB, Gynecology, Cardiac and small parts

### 9.2 Input characters through the keyboard

Operation:

1. Press **【COMMENT】** key to enter into annotation status.
2. Move the cursor with the trackball to the desired position for annotation.
3. Input the normal characters via the keyboard. The first 20 characters will be shown on the screen.
  - **【SHIFT】** key is used to input the upper character on each alphanumeric key, such characters (such as “♀”, “♂”). To input the upper character on each alphanumeric key, please press **【SHIFT】** key first, then press the corresponding alphanumeric keys. At this status, if lower character on each alphanumeric key needs to be input, please press **【SHIFT】** key again.
  - **【CAPS LOCK】** key is used to switch capital letters and small English letters. To input capital English letters, please press **【CAPS LOCK】** key first, then press the corresponding alphanumeric keys. At this status, if small English letters need to be input, please press **【CAPS LOCK】** key again.
4. Press **【SET】** key to finish the annotation. Press **【COMMENT】** to exit from annotation status, **【COMMENT】** key will get dark.

### 9.3 Input annotation from the database

Operation:

1. At the annotation status, move the cursor with the trackball to the required position for annotation on the image, press **【CANCEL】** key and a dialogue box appears for inputting annotation on the screen (please refer to Fig9-2).
2. Move the cursor to the required item shown in the left part of dialogue box, press **【SET】** key and all the relevant annotation terms under this item appear in the right part of the dialogue box. Move the cursor to the required annotation term. Then move the cursor to [OK] and press **【SET】** key to confirm it. The dialog box will disappear and the selected annotation term will be inserted into the required position.

If no annotation needs to be input from database, please click [Cancel] button or [×] to close dialogue box.



Fig. 9-2 Dialogue box for inputting annotation from the database

### 9.4 Clear the annotation

- A. Clear the inputted characters during annotation status  
During annotation status, please press **【←】** key to delete the inputted characters.
- B. Clear all the annotations on the image area  
Press **【CLR】** key to clear all the annotations on the image area.



**Caution:** After pressing **【CLR】**key, all the measurements and the body marks will be cleared at the same time.

## Chapter 10 Body Marks

### 10.1 Introduction

Body mark is used to point out the body part being examined and the scanning direction of the probe. In fact the body mark acts as a comment on the image.

Five categories of body marks are available: Bovine, Equine, Ovine, Canine and Feline. Each category has different body marks, please refer to the following figures:

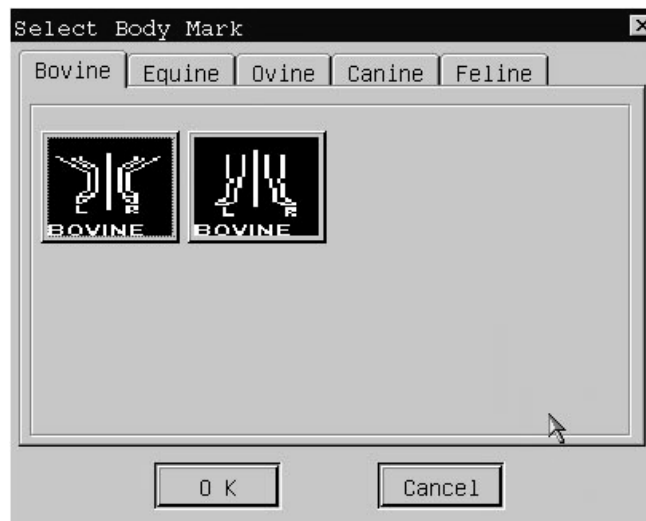


Fig 10-1 Bovine body marks

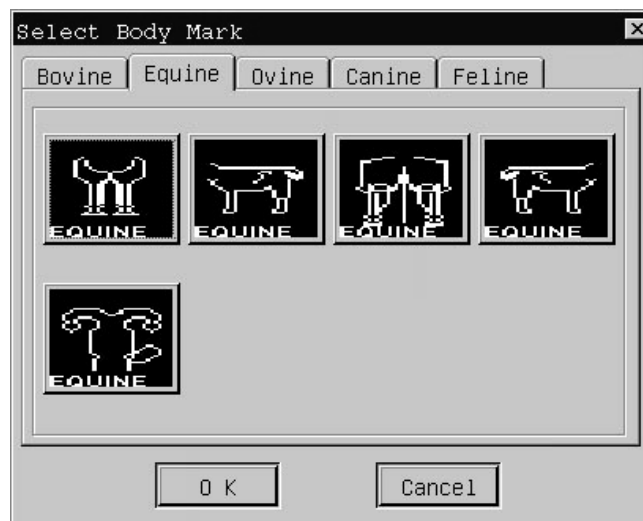


Fig. 10-2 Equine body marks

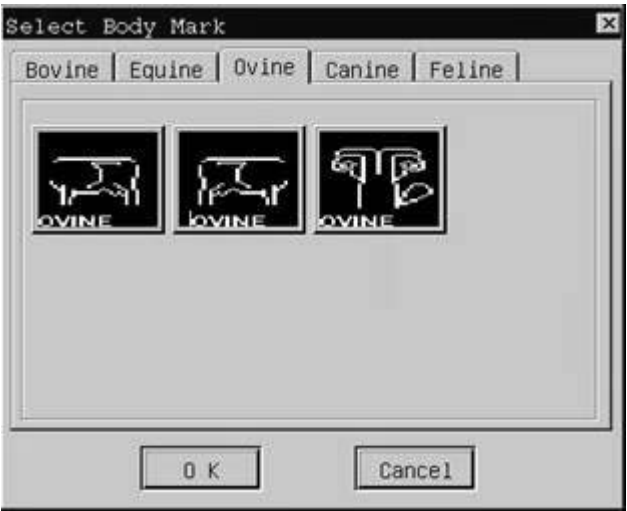


Fig10-3 Ovine body marks

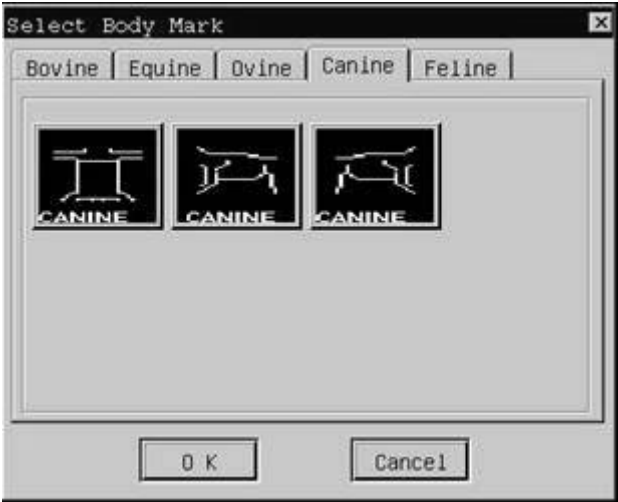


Fig.10-4 Canine body marks

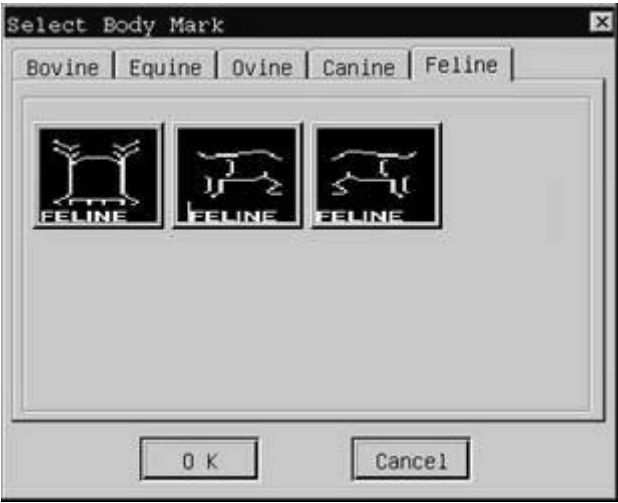




Fig. 10-5 Feline body marks

## 10.2 Operation of body marks

Operation:

1. Press **【FREEZE】** to freeze the image, press **【BODY MARK】** key, the **【BODY MARK】** key will get back-lit and the dialogue box for selecting body marks will appear.
2. Move the cursor with the trackball to select the relevant category which is same as current exam mode, then the corresponding body marks in the selected exam mode will appear.
3. Move the cursor to click the required body mark first, then click [OK] to confirm and the selected body mark appears on the image with the marker . If no body mark needs to be added, please click [Cancel] button or [×] to close dialogue box.
4. The marker  is used to indicate the start position of probe scanning. Move this marker with the trackball to the required position, and press **【SET】** key to fix it, and an arrow appears to indicate the probe scanning direction.
5. Turn the trackball to confirm the probe scanning direction, then press **【SET】** key to fix it. The **【BODY MARK】** key will get dark at this time, and the body mark is completely added on the image. To clear the added body mark, please press **【CLR】** key. Or press **【FREEZE】**.

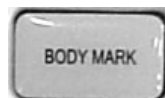


Fig 10-6 BODY MARK key



**Caution:** During the status to add body mark, it is prohibited to defreeze the image. To defreeze the image, please finish the operation of adding body mark first.

## Chapter 11 Biopsy

### 11.1 Enter into/ Exit from Biopsy status

How to enter into Biopsy status:

At real-time status, move the cursor to menu option-"BIOPSY" in [B IMAGE MENU], press **【SET】** key to enter into Biopsy status, it will display biopsy sample line in the image area.

B IMAGE MENU	
A.POWER	10
FOCUS NO.	1
FOCUS POS	
FREQ.	7.5M
DYNAMIC	30
EDGE ENHA.	0
SMOOTH	1
ZOOM	OFF
FRAME AVG.	0
SCAN LINE	>>
POST PROCESS	>>
BIOPSY	
PRESET	

Fig.11-1 Biopsy menu



Fig. 11-2 Biopsy sample line on the image



How to exit from Biopsy status:

At Biopsy status, move the cursor to menu option-“BIOPSY” in [B IMAGE MENU], press **【SET】** key to exit from Biopsy status, the biopsy sample line will disappear.



**Caution:** Biopsy function is only available in B mode on the probe C60613S and L40617S.

## 11.2 Use biopsy kit



**Caution:** Only the biopsy kit provided by CHISON company are allowed to use with the system!

### 11.2.1 Check before using the biopsy kit:

Before using the biopsy kit on real patient, users must do necessary check and adjustment to make sure the biopsy needle scan line conforms to the biopsy sample line in the image area.

Please refer to biopsy kit user manual for the details of check and adjustment method.

Please carefully use biopsy kit to do the operation. We'll not take any responsibility for any damage caused by the improper use of the biopsy kit or the improper operation of the puncture process.

### 11.2.2 Sterilization and disinfection

Before and after using the biopsy kit, please make sure the probe and biopsy kit to be sterilized and disinfected to meet standard medical application requirement.

Recommended sterilization and disinfection method as below:

1. Please take good care of the probe and biopsy kit. Collision and dropping is strongly prohibited;
2. Please use the ultrasound gel which is acknowledged by the manufacture of the unit. We recommend AQUASONIC Gel made by R. P. Kincheloe Company in USA;
3. Wash the probe and biopsy kit:
  - 1) Probe tip  
Rinsing: ..... Rinse the surface with running water, and use a sponge or soft cloth to remove gently the dirt and gel on probe tip
  - 2) Connector, Cable, other part of the probe tip must not be soaked in a solution. Simply clean it by using a soft cloth moistened with alcohol and then dry it.
4. Disinfection: When necessary, soaking the probe tip in disinfection solution. The recommended disinfection solution is CIDEX ACTIVATED DIALDEHYDE SOLUTION. (Manufacturer: Johnson and Johnson Medical) . It has been approved by the FDA , its 510(K) number is K924434.. The following instructions are provided by Johnson and Johnson

Medical . For more detail, please contact Johnson and Johnson Medical

1) Soaking temperature: 10°C~40°C

2) Atmospheric pressure: 700hPa~ 1060hPa

3) Soaking time: Under FDA requirements, CIDEX Activated Dialdehyde Solution requires 45 minute processing at 25°C for high level disinfection. The 45 minute processing time was established as the time to kill 6 logs of the test organism.

5. Rinsing: Sufficiently rinse the probe by using water to remove chemicals.

6. Aeration and let the probe become dry in normal temperature.

7. Please strictly keep the probe away from the paint thinner, ethylene oxide, other organic solvent, etc

8. Please keep the probe inside the probe case when it is not in use.

9. Dipping the probe or the cable into any liquid is strongly prohibited.



**Warning:** Please immediately stop using the probe and system if there is any broken phenomenon on the electricity cable or the probe transducer. Otherwise there will be a danger of the electricity shock.

## Chapter 12 Save and Recall

### 12.1 Introduction

Save/ Recall function allows users to store the frozen image and current patient information into the memory, and provides the management function for stored data and file. By connecting USB memory disk to USB port on the system, users can save massive data and file to the connected USB memory disk.

At frozen status, press **【MEMORY】** key, the **【MEMORY】** key will get back-lit, and a dialog box- “Save/ Recall” will appear on the screen as below:

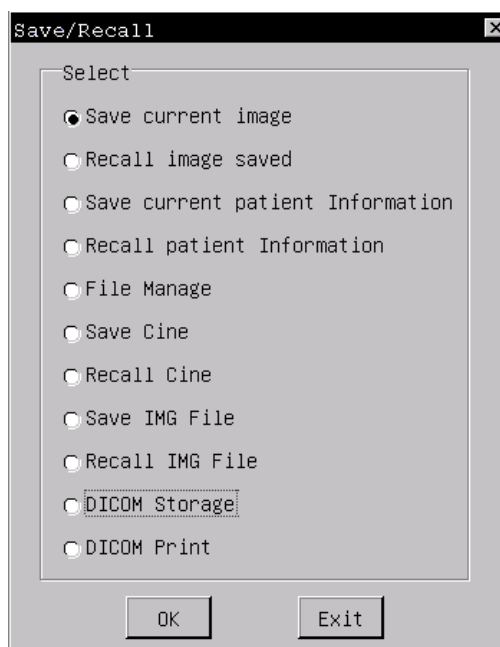


Fig. 12-1 Save/Recall menu

Press **【SET】** key on “Exit” button or **【X】** button at top right corner of the dialog box to exit from save/recall function, the **【MEMORY】** key will get dark.



**Note:** To fast select menu item in the dialog box-“Save/Recall”, please use Toggle-switch key.



**Note:** Shortcut key in Save/Recall function:

**【MEMORY】** key can be used to replace the following operation:

1. Move the cursor on “OK” button on the dialog box-“Save/Recall” and press **【SET】** key .
2. Move the cursor on “Save” button on the dialog box-“Save File” and press **【SET】** key .
3. Move the cursor on “Open” button on the dialog box-“Open File” and press **【SET】** key .



**Note:** When you use USB memory disk on the ultrasound system, please make sure the following:

1. Its file format should be FAT32, otherwise, please format USB memory disk as FAT 32 in Windows operation system.

2. It is strongly prohibited to pull out the connected USB memory disk when the system is saving, recalling the files or managing the files or directories saved in the USB memory disk (During working status, the indicator on the USB memory disk is flickering).
3. Please use the same USB memory disk during the operation before switching off the system.
4. It is suggested the USB memory disk is kept only for the ultrasound examination purpose, please don't copy any files on this disk which are not relevant to ultrasound diagnosis examination.

## 12.2 Save current image

The function to store current image is only available at frozen status.



### Note:

1. If there is no USB memory disk connected to the system, the image file will be saved as jpg or bmp format in the system under the default directory: **/harddisk/bmp/current patient ID.**
2. When USB memory disk is connected to the system, the image file will be saved as jpg or bmp format in the connected USB memory disk under the default directory: **/udisk/bmp/current patient ID.**
3. If users want to store the images directly in the system, please make sure no external USB memory disk is connected to the system.

Operation procedure:

1. Freeze the image.
2. Press **【MEMORY】** key, then the dialog box- “Save/ Recall” appears on the screen.
3. The default selection is item-“Save current image”, move the cursor on “OK” button and press **【SET】** key or press shortcut key **【MEMORY】** directly to save the current image.
4. If a USB memory disk is connected to the machine, the selection of image storage path will appear. You can select the path as you want.

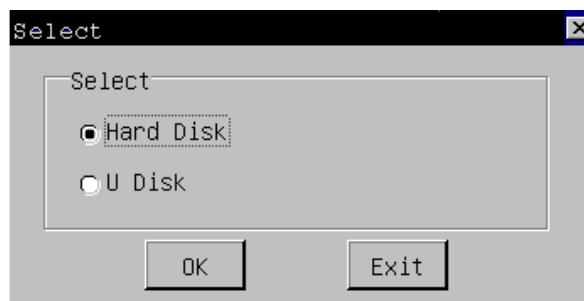



Fig 12-2 Dialog box of selection of image storage path

5. Then a dialog box-“Save File” appears, input the file name, move the cursor to “Save” button and press **【SET】** key or press shortcut key **【MEMORY】** directly to finish the operation. The system will automatically store the current screen information. You can select the image format by pressing the button  above the “CANCEL” button. If press **【SET】** key on “Cancel” button or **「×」** button at top right corner of the dialog box, it will exit from Save File function without saving any information.

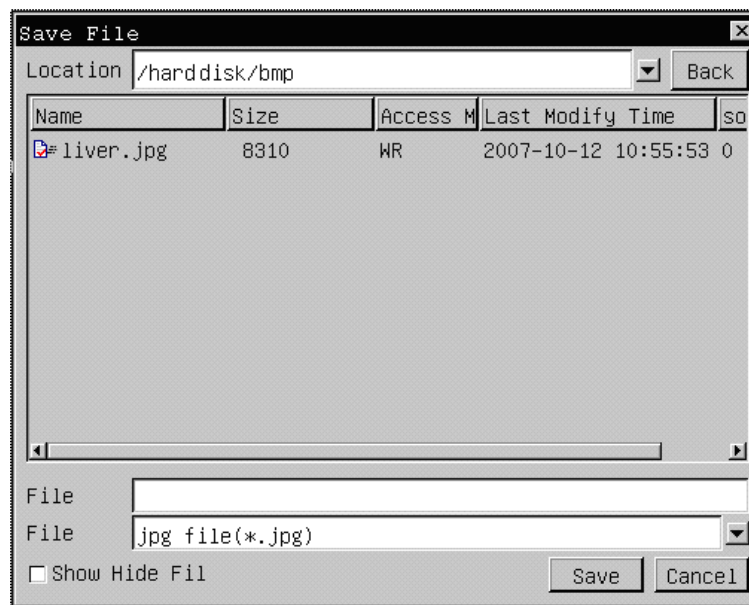


Fig. 12-3 Dialog box for saving image

6. After the image is saved successfully, the following dialog box will appear.



Fig. 12-4 Dialog box after successful image storage

**Note:** During image storing process, the **【MEMORY】** key keeps on the back-lit status. If image storing process is finished, the **【MEMORY】** key will get dark.

**Caution:** During image storing process, please don't make any keyboard operation until **【MEMORY】** key gets dark, including moving the trackball, otherwise it will affect the quality of the saved image.

### 12.3 Recall the saved image

The function to recall the saved image is only available at the frozen status.

Operation procedure:

1. Freeze the image.
2. Press **【MEMORY】** key, then the dialog box- "Save/ Recall" appears on the screen.
3. Select menu item- "Recall image saved" from the dialog box- "Save/Recall", move the cursor on "OK" button and press **【SET】** key or press shortcut key **【MEMORY】** directly to recall saved image.
4. If a U disk is connected to the machine, the selection of image recall path will appear. You can select the path as you want.

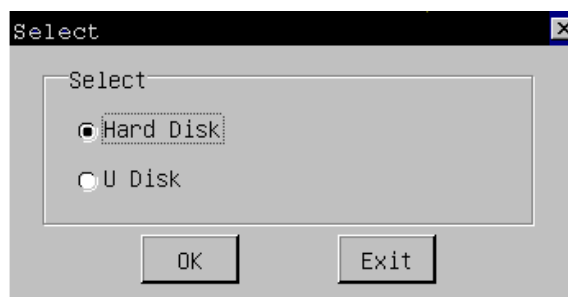


Fig 12-5 Dialog box of selection of image recall path

5. Then a dialog box-“Open File” appears, move the cursor onto the desired image file and press **【SET】** key to select it, move the cursor to “Open” button and press **【SET】** key to finish the operation. The system will recall the selected image file. If press **【SET】** key on “Cancel” button or **「×」** button at top right corner of the dialog box, it will exit from Open File function without opening any image file.

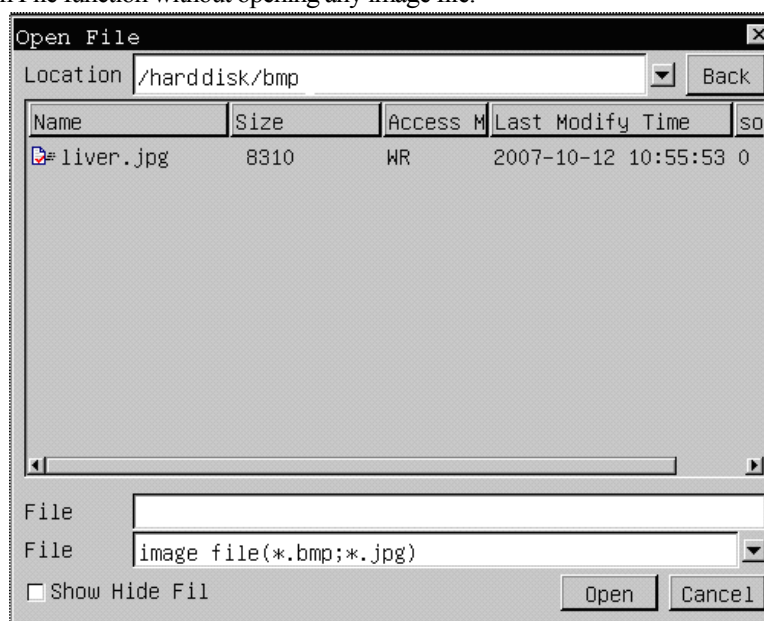


Fig. 12-6 Dialog box for recalling the saved image

## 12.4 Store current patient information

The system allows saving current patient information in the system for doctor's convenient search and management.

Operation procedure:

1. Freeze the image.
2. Press **【MEMORY】** key, then the dialog box-“Save/ Recall” appears on the screen
3. Select menu item-“Save current patient Information” from the dialog box-“Save/Recall”, move the cursor on “OK” button and press **【SET】** key or press shortcut key **【MEMORY】** directly to save the current patient information. The current patient information input when creating this patient in the system, such as patient name and patient age, will be saved in the system automatically.



**Caution:** Only after the above operation is performed, the patient information will be saved in the system permanently even after the system is switched off. Otherwise, the system will save the patient information temporarily till the system is switched off.

## 12.5 Recall patient information

Doctors can recall the stored patient information to do further check, the dialog box is shown as follows:

Fig 12-7 Dialog box of recalling the patient information

Operation procedure:

1. Freeze the image
2. Press **【MEMORY】** key and the dialog box- “Save/ Recall” appears.
3. Select menu item-“Recall patient Information”, move the cursor to “OK” button and press **【SET】** key or press shortcut key **【MEMORY】** directly to enter into the function of recalling patient information..
4. A dialog box-“Patient Information Table” appears, move the cursor to the required patient, press **【SET】** key to confirm the selection, then the patient details will be shown on the left bottom of dialog box.
5. If there is any image file saved under the current patient ID No., all the images saved in both the system and the connected USB memory disk (if there is any) will be displayed at the right bottom of the dialog box. For image preview, please move the cursor onto one of these image files and press **【CANCLE】** key. To exit from image preview status, please press **【SET】** key on “Exit” button on the image preview window.
6. **【Add】** button is used to add a new patient information. **【Del】** button is used to delete the patient information. Please select the existed patient information first and then press the **【Del】** button. The patient information will be deleted. **【Modify】** button is used to modify the existed patient information. Please select the patient information first, the patient information will be showed in the following dialog box. You may revise the patient information and then click **【Modify】** button. The patient information will be modified.
7. To exit from the dialog box-“Patient Information Table”, please move the cursor to “Exit” button in the middle of the dialog box(near to right side) and press **【SET】** key .

## 12.6 File management

File management function allows users to copy, delete or rename the existing directory and file, or allows users to

create a new directory.

How to enter into file management function:

1. Freeze the image.
2. Press **【MEMORY】** key, then the dialog box- "Save/ Recall" appears on the screen
3. Select menu item- "File Manage" from the dialog box- "Save/Recall", move the cursor to "OK" button and press **【SET】** key or press shortcut key **【MEMORY】** directly to enter file management function. A dialog box- "Manage Files" appears.

How to open the current directory and back to parent directory:

1. Move the cursor onto the current directory shown on the dialog box- "Manage Files", the selected directory will be highlighted.
2. Press **【SET】** key twice quickly to open the selected directory. "BACK" button will appear on top right of the dialog box.
3. Move the cursor to "BACK" button and press **【SET】** key to back to parent directory.



**Note:**

1. If there is no USB memory disk is connected to the system, it will identify the files and directories saved in the system automatically after entering into file management function.
2. When the USB memory is connected to the system, it will identify the files and directories saved in both the system and the connected USB memory disk.
3. The meaning of following buttons shown on the dialog box- "Manage Files":  
 "hard disk" button means the system;  
 "u disk" button means the connected USB memory disk. "u disk" button is only available when the USB memory disk is connected to the system)  
 If you move the cursor to "hard disk" button and press **【SET】** key, it will display all the files and directories under the root directory of the system.  
 If you move the cursor to "u disk" button and press **【SET】** key, it will display all the files and directories under the root directory of the connected USB memory disk.



**Caution:**

1. When using file management function, please make sure the name of the directory and file to be managed is no more than 8 characters.
2. Please don't delete or rename the existing directory (e.g. bmp, report) and files saved in the system and the connected USB memory disk.
3. Please don't copy any files not relevant to ultrasound diagnosis examination to the system and the connected USB memory disk.



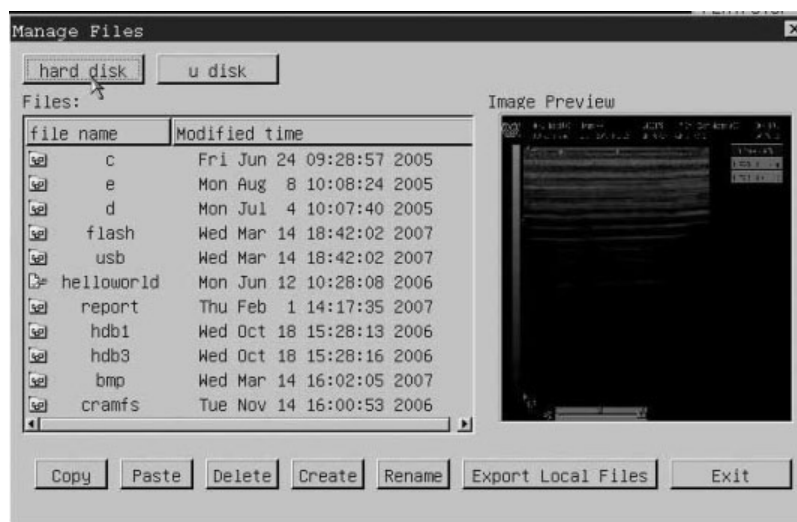


Fig. 12-8 Dialog box for path selection

### 12.6.1 Directory management

Directory management function allows users to copy, delete or rename the existing directory, or create a new directory.

Operation procedure:

1. Enter into file management function and a dialog box-“Manage Files” appears.
2. Select either “hard disk” button or “u disk” button to display the files and directories.
3. Directory management

#### 3.1 To create a new directory:

Please select the path to create the directory first, move the cursor to “Create” button and press **【SET】** key. A dialog box-“New Directory” appears, move the cursor to blank frame on the dialog box and press **【SET】** key, the cursor will change as flickering mark “|”, input the directory name in it. Move the cursor to “OK” button and press **【SET】** key to confirm the input directory name. If press **【SET】** key on “CANCEL” button or **【×】** button at top right corner of the dialog box, it will exit from New Directory function without creating any new directory.



Fig. 12-9 Dialog box-Establish a new directory



**Caution:** The name of a created directory can't be the same as that of an existing directory in the same parent directory.

#### 3.2 To rename an existing directory:

Move the cursor onto the required directory and press **【SET】** key, the selected directory will be highlighted. Move cursor to “Rename” button and press **【SET】** key, a dialog box-“Rename Directory” will appear, move the cursor to blank frame on the dialog box and press **【SET】** key, the cursor will change as flicking mark “|”, input new directory name in it. Move the cursor to “OK” button and press **【SET】** key to confirm the input

directory name. If press **【SET】** key on “CANCEL” button or **「×」** button at top right corner of the dialog box, it will exit from Rename Directory function without renaming the selected directory.



Fig. 12-10 Dialog box- Rename a directory

**! Caution:** The new name of a renamed directory can't be the same as that of an existing directory in the same parent directory.

### 3.3. To delete the directory:

Move the cursor onto the desired directory and press **【SET】** key, the selected directory will be highlighted. Move cursor to “Delete” button and press **【SET】** key, a dialog box “Delete This Directory?” appears asking for confirmation of the operation, move the cursor to “OK” and press **【SET】** key to confirm deleting the selected directory..

### 3.4 To copy the existing directory:

Move the cursor onto the desired directory to be copied and press **【SET】** key, the selected directory will be highlighted. Move cursor to “Copy” button and press **【SET】** key, then select the path to paste the selected directory, move the cursor to “Paste” button and press **【SET】** key.

**! Caution:** The copied directory can't be pasted into the same parent directory.

## 12.6.2 File management

File management function allows user to copy, delete and rename the existing image and report file, or do image preview.

Operation procedure to do image preview:

1. Please follow the steps from 1 to 2 in 12.6.1 and select either “hard disk” or “u disk” first.
2. Move the cursor onto the desired image file (bmp or jpg format) and press **【SET】** key twice quickly to open the image file at right side of the dialog box. For image preview, please move the cursor onto the opened image at right side and press **【CANCELE】** key. To exit from image preview status, please press **【SET】** key on “Exit” button on the image preview window.

Operation procedure to copy the image or report file:

1. Please follow the steps from 1 to 2 in 12.6.1 and select either “hard disk” or “u disk” first.
2. Move the cursor onto the required image file (bmp or jpg format) or report file and press **【SET】** key, the selected file will be highlighted.
3. Move the cursor to “Copy” button and press **【SET】** key. Select the path where to paste the selected file.
4. Move the cursor to “Paste” button and press **【SET】** key to finish copying the selected file.

The operation procedure to delete and rename the file is the same as that of Directory (please refer to 12.6.1)



- Caution:**
1. The copied file can't be pasted into the same directory.
  2. The new name of a renamed file can't be the same as that of an existing file in the same directory.

### 12.6.3 Copy single image or report file from the system to the connected USB memory disk

Operation procedure:

1. Make sure USB memory disk is connected to the machine before file transfer.
2. Freeze the image.
3. Press **【MEMORY】** key, a dialog box-“ Save/Recall” appears.
4. Select menu item-“File Manage” from the dialog box-“Save/Recall”, move the cursor to “OK” button and press **【SET】** key or press shortcut key **【MEMORY】** directly to enter file management function.

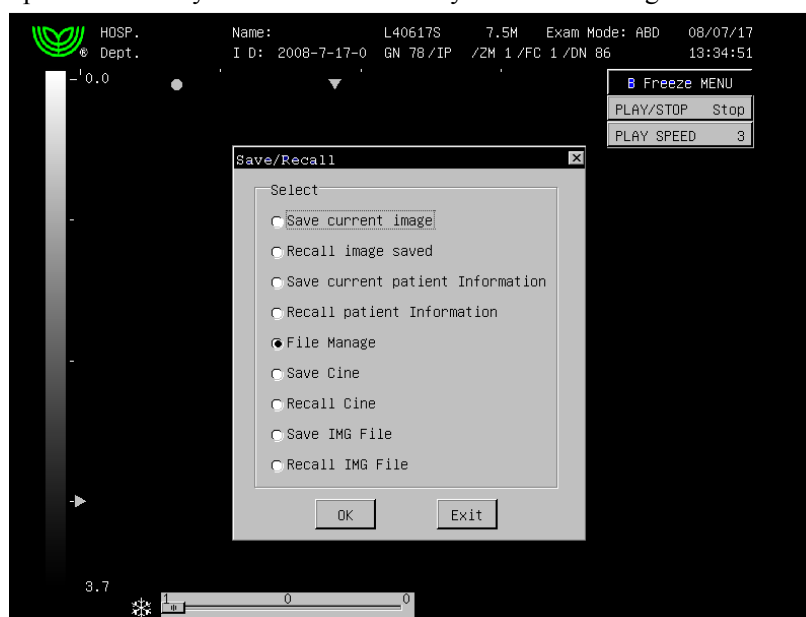


Fig. 12-11 Select File Management function

5. A dialog box- “Manage Files” appears as Fig 12-12.

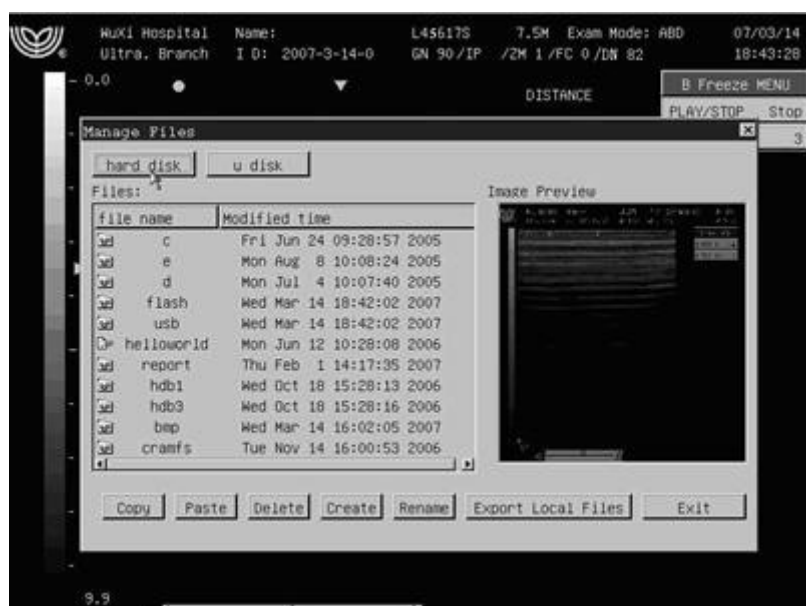


Fig. 12-12 Dialog box- Manage Files

6. Select **hard disk** to display all the files and directories under the root directory of the system. Select the file to be copied and press **【SET】** key, the selected file will be highlighted.
7. Move the cursor to “Copy” button on the dialog box-“Manage Files”
8. Select **u disk** and all the files and directories under the root directory of the connected USB memory disk will appear (shown as Fig.12-13).

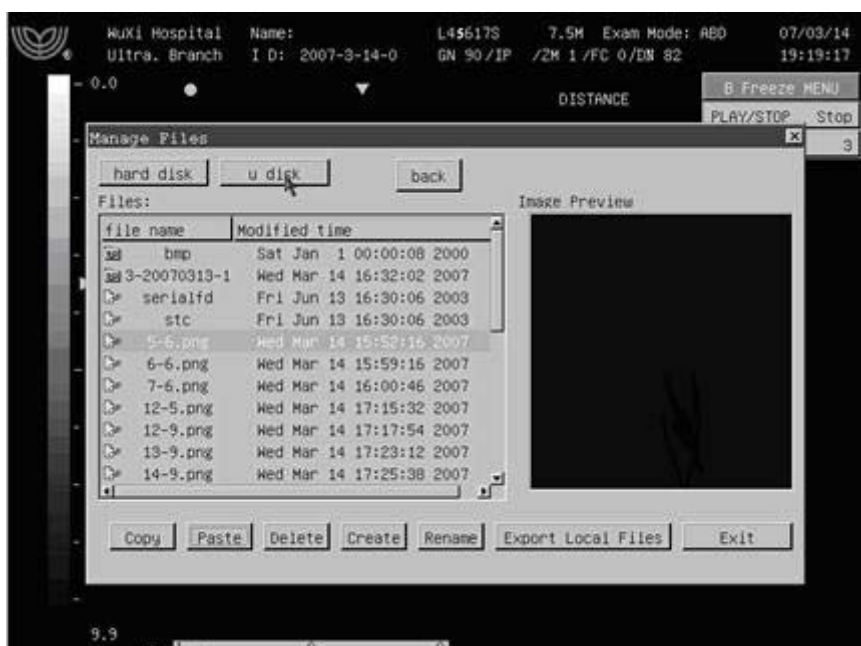


Fig. 12-13 Select the connected USB memory disk

9. Select the relevant directory or create a new directory on the USB memory disk and open it.
10. Move the cursor to “Paste” button on the dialog box-“Manage Files” to finish file copy operation (shown as Fig. 12-14).

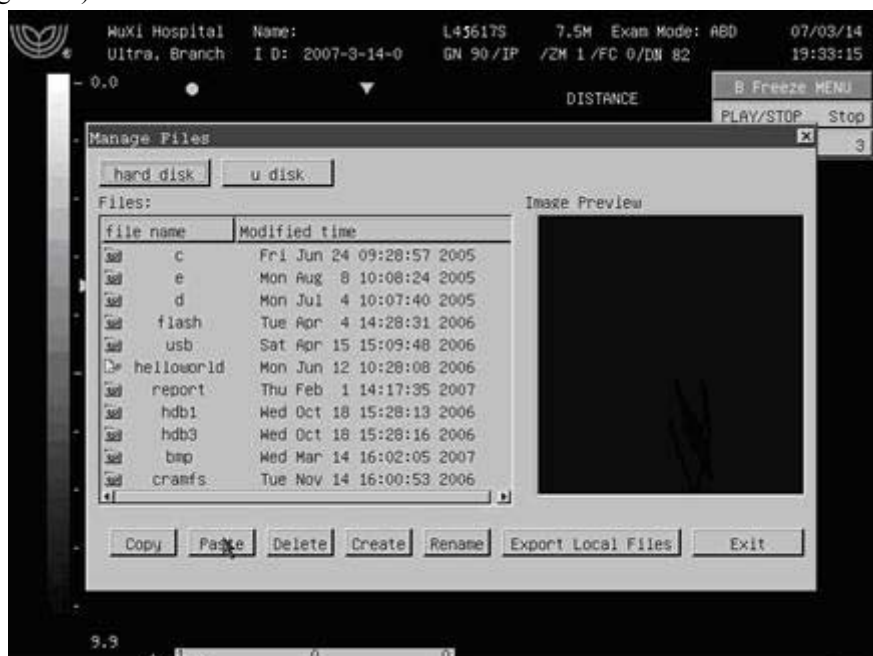


Fig. 12-14 Paste operations

11. Repeat the steps from 6 to 10 to transfer other image files one by one
12. Press **【SET】**key on “Exit” button or **【×】** button at top right corner of the dialog box to exit file manage function.

### 12.6.4 Shortcut operation to copy all image and report files from the system to USB disk

Operation procedures:

1. Follow the steps from 1 to 5 in 12.6.3.
2. Move the cursor to “Export Local Files” button on the dialog box-“Manage Files” and press **【SET】** key, the following operation will be performed immediately:  
All the image files in the directory-**bmp** saved in the system will be copied into the subdirectory-**bmp** of the directory-**local** under the root directory of the connected USB memory disk  
All the report files in the directory-**report** saved in the system will be copied into the subdirectory-**report** of the directory-**local** under the root directory of the connected USB memory disk.
3. Press **【SET】** key on “Exit” button or **[ × ]** button at top right corner of the dialog box to exit file manage function.

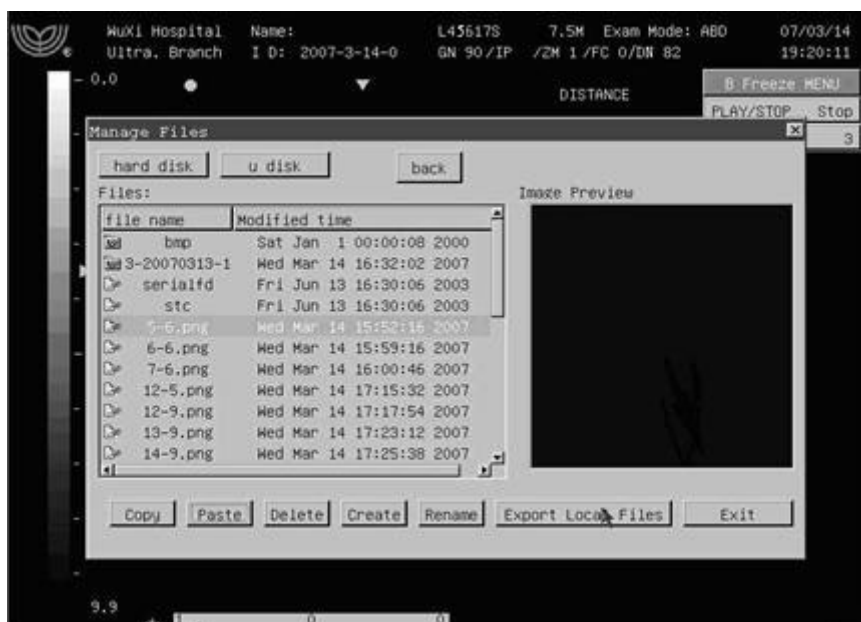


Fig. 12-15 Operation-Export Local Files

## 12.7 Save Cine

Cine file(\*. Cine): it can save the real-time B mode images of Cine-memory in the external USB memory disk at the unit of frame in time sequence. The operation to save the Cine file is similar to “Save current image”, please refer to the section 12.2 of this chapter.



#### Note:

1. The Cine file can be saved in the USB memory disk only, please make sure external USB memory disk is connected to the system before saving cine file.
2. The Cine file will be saved in the connected USB memory disk under the default directory: **/udisk/cine/current patient ID**.

## 12.8 Recall Cine

The operation to recall the saved Cine file is similar to “Recall the saved image”, please refer to the section 12.3 of this chapter. When the users recall the saved Cine file, after selecting and opening the saved Cine file, please press the **【CINE】** key to enter Cine-memory status first, then play back the images saved in the Cine file manually or automatically (please refer to Chapter 8 for playback of Cine-memory).

**Note:**

The system can recall the Cine files saved in USB memory disk. Make sure external USB memory disk is connected to the system before recalling cine file.

## 12.9 Save IMG file

IMG file (\*.IMG): the system can save the B mode image as IMG file in the external USB memory disk. The saved IMG file can be recalled in the system for measurement and calculation. The operation to save the IMG file is similar to “Save current image”, please refer to the section 12.2 of this chapter.

**Note:**

1. The IMG file can be saved in the external USB memory disk, please make sure external USB memory disk is connected to the system before saving IMG file.
2. The IMG file will be saved in the connected USB memory disk under the default directory: **/udisk/img/current patient ID**.

## 12.10 Recall IMG file

The operation to recall the saved IMG file is similar to “Recall the saved image”, please refer to the section 12.3 of this chapter. When the users recall the IMG file saved in the USB memory disk, after selecting and opening the saved IMG file, please press the **【CINE】** key to recall the IMG file and start the measurement and calculation.

**Note:**

The system can recall the IMG files saved in USB memory disk. Make sure external USB memory disk is connected to the system before recalling IMG file.

## 12.11 Dicom storage

Select **“Dicom Storage”** and press **“Ok”**, then Dicom file will be built and sent to workstation automatically.

## 12.12 Dicom print

Select **“Dicom Print”** and press **“Ok”**, then Dicom file will be built and print automatically.

## Chapter 13      Preset

This chapter introduces the operation to make settings of the system through preset menu at preset mode.

Preset function is used to set up working environment and status, parameters of each examination mode. The setting will be stored in the memory of system and not be lost even after the system is switched off. When the system is switched on, it will work automatically with the status which is required by the operator.

### 13.1 Enter into/Exit from Preset mode

How to enter into Preset mode:

At real-time status, move the cursor to menu item-“PRESET” in [B IMAGE MENU] or [B/M IMAGE MENU], press **【SET】** key and [PRESET] submenu appears, the system enters into Preset mode.

Select the menu item listed on the submenu to preset the corresponding parameters.

PRESET
GENERAL SETTING
ABDOMEN EXAM
OB/GYN EXAM
SMALL PART EXAM
UROLOGY EXAM
USER EXAM
GAIN SETTING
SAVE PRESET
LOAD PRESET
DEFAULT PRESET
B POST PROCESS
COMMENT
UPGRADE
BACK

Fig 13-1      Preset menu

How to exit from Preset mode:

In preset mode, move the cursor to menu item-“Back” in [PRESET] submenu, press **【SET】** key to exit from Preset mode, and the system will run according to the modified parameters.



**Note:**

1. After entering into Preset mode, if you need to do any operation other than preset operation, please exit from Preset mode first.
2. If you press “SAVE PRESET”, you can save the preset you preferred into USB automatically.
3. If you press “LOAD PRESET”, you can recall the preset you saved in the USB before on another machine.
4. If you press “DEFAULT PRESET”,

## 13.2 General setting

Move the cursor to menu item-“GENERAL SETTING”, press **【SET】** key, a dialog box-“General Setting” appears, which is shown as follows:

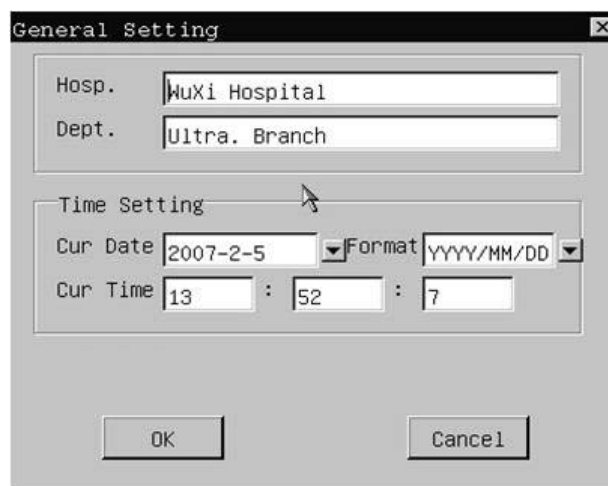


Fig 13-2 Dialog box of General Setting

For the meaning of items in dialog box, please refer to the following sheet:

List 13-1 Items shown in the dialog box of General Setting

Function name	Setting method	Function description
Hospital	Input freely	Set up the hospital name which is shown at top left corner of “General Setting” dialog box, 20 characters Max. can be input
Department	Input freely	Set up the department name shown at top left corner of “General Setting” dialog box, 20 characters Max. can be input
Current date	Set up freely	Set up the system date (calendar format), select current date directly. Date format can be changed by format setting.
Current time	Set up freely	Set up the working clock of the system.
Format	Set up freely	Set up date format
Language	Select language	Select the language of operation interface(English or German)

## 13.3 Preset of exam mode

There are 5 kinds of exam mode used for Abdomen (normal), OB/GYN, Urology, Small parts, User-defined mode. A set of proper running environment has been set default for each exam mode before the delivery. The setup content of each exam mode is similar. Take setup of OB/GYN exam mode for example:

Move the cursor to menu item- “OB/GYN EXAM” in Preset menu and press **【SET】** key to enter into OB/GYN exam mode preset status.



In the dialog box of OB/GYN exam-mode preset, 4 preset pages are available respectively for image parameters, probe parameters, calculation formulae and IP.



**Note:** The function of the following button shown on the dialog box of exam-mode preset:

1. “Default Setup” is used for recalling the default setting of all the parameter items on the page of [Parameters], [Probe] and [IP].
2. “Current Save” is used for saving image parameter setting on the current page ([Parameters], [Probe], [IP], or [Formula]) temporarily. When you need to set the parameter items on the different pages in one time, you may set the parameter values on one page (e.g. [Parameters]) first, move the cursor to “Current Save” button at left side of the bottom of this page to save the setting temporarily, then select another page (e.g. [Probe] ) and set the parameter values.

### 13.3.1 Preset of Parameters

On [Parameters] page, the default setting of image parameters for each probe has been saved in the system before the delivery.

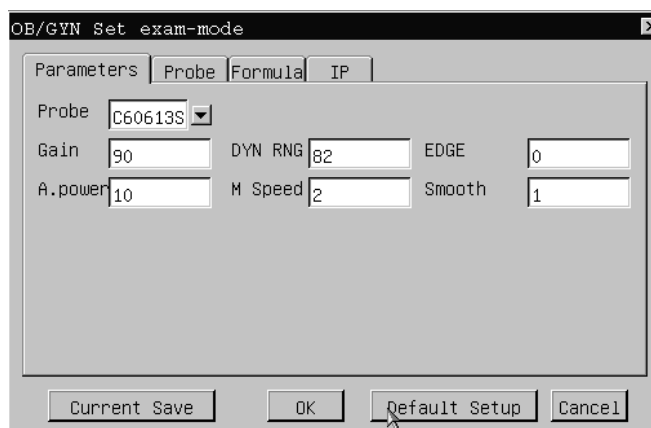


Fig 13-3 Dialog box for Parameters setting of OB/GYN exam mode

Parameters shown on [Parameters] page are introduced as below:

List 13-2 Parameters on [Parameters] page

Function Name	Setting method	Function description
Probe	C60613S L40617S C12616S C20613S L40617S-REC	Select probe type
Acoustic power	0~11	Set acoustic power, totally 12 levels
Gain	0~99	Set total gain, totally 100 levels
Dynamic range	30~90	Set dynamic range, totally 16 levels (4/step)
M Speed	1~4	Set M mode sweep speed
Edge enhancement	0~3	Set image edge enhancement
Smoothness	0~3	Set image smoothness processing

Operation procedure to set the parameters on [Parameters] page:

1. Select the probe type from ▾ beside the column-“Probe”, then the default setting of image parameters appears on the dialog box.
2. To change image parameter setting (e.g. Gain), please move the cursor to the frame beside the parameter item (e.g. Gain), press 【SET】 key and the cursor will change as flickering mark “|”, change the parameter value.
3. To confirm the above change, move the cursor to “Current Save” button and press 【SET】 key. If you move the cursor to “Default Setup” button and press 【SET】 key, the system will discard the above change and recall the default setting.
4. Move the cursor to “OK” button and press 【SET】 key, it will save the change of image parameter setting and exit.. If you move the cursor to “Cancel” button or [×] button at top right corner and press 【SET】 key, it will exit without saving the change of image parameter setting.

### 13.3.2 Preset of Probe

Related parameters of the probes can be set up in [Probe] page.

Move the cursor to [Probe] button and press 【SET】 key to open the probe parameters preset page, see below:

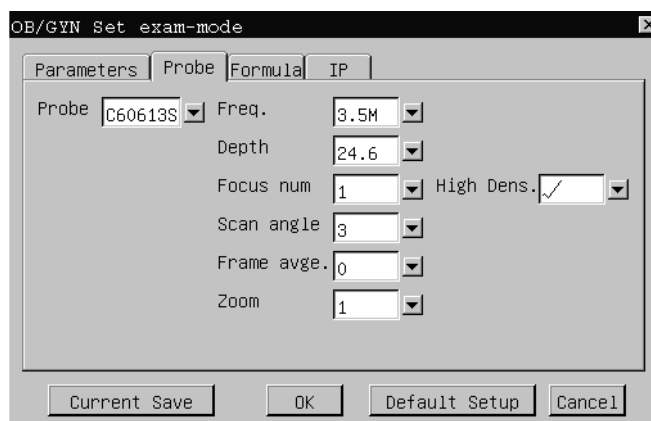


Fig 13-4 Dialog box for Probe setting of OB/GYN exam mode

The items on [Probe] page are described as below:

List 13-3 Preset parameters on [Probe] page

Function Name	Setting method	Function description
Probe	C60613S L40617S C12616S C20613S L40617S-REC	Select probe type
Frequency	C60613S: 2.5/3.5/4.0/5.0 MHz L40617S: 5.0/6.0/7.5/10.0 MHz C12616S: 4.5/6.0/7.0/8.0 MHz C20613S: 2.0/3.0/3.5/4.5 MHz L40617S-REC: 5.0/6.0/7.5/10.0 MHz	Set probe frequency
Depth	Different probe provides different scanning depth for selection	Set scanning depth of the probe

Focus No.	1, 2, 3, 4	Set focus point No.
Scan angel	0, 1, 2, 3	Set scanning angel of the probe
Frame averaging	0, 1, 2, 3, 4, 5, 6, 7	Set frame averaging of the probe
Partial zooming	1, 2, 3, 4	Set partial zooming of the probe
High density	√, ×	Set ON or OFF status of high density

### 13.3.3 Set calculation formulae

Two kinds of OB calculation formulae can be preset: GA calculation formula and Fetal Weight calculation formula.

Move the cursor to [Formula] button and press **【SET】** key to open the Calculation Formula page as follows:

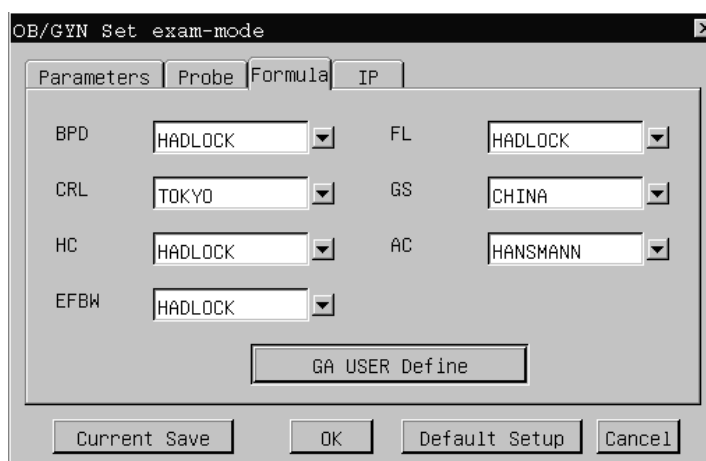


Fig 13-5 Dialog box for Formula setting of OB/GYN exam mode

The items on [Formula] page are described as below:

List 13-4 Preset calculation formula on [Formula] page

Measurement item	Formula to be selected
BPD	China / HADLOCK / GA -USER
CRL	China/ Tokyo University / HADLOCK / GA-USER
HC	HADLOCK / Hansmann / GA-USER
FL	China/ HADLOCK / GA-USER
GS	China/ Tokyo University / GA-USER
AC	HADLOCK / Hansmann / GA-USER
Fetal Weight	Tokyo University / Osaka University / HADLOCK

The function of “GA USER Define” button:

Set up user-defined formula suitable for different people.

Operation procedure:

1. Move the cursor to “GA USER Define” button, press **【SET】** key to enter into the editing interface of GA USER Define.
2. Select the item to be user-defined, e.g. BPD, and the relevant GA table appears.
3. Move the cursor to the required user-defined value at the right of the data list, press **【SET】** key to light the data item. 3 kinds

- of parameters will show at the left of the dialog box, the parameters of Week/ Day can be modified.
- After modifying the parameters of Week/Day, move the cursor to “MODIFY” button and press **【SET】** key to confirm the modification.
  - Move the cursor to “EXIT” button or **「 × 」** button at top right corner after complete modification, press **【SET】** key to exit from the editing interface. When user-defined formula is selected for EDD items (e.g. BPD) later, the system will recall the user-defined parameters according to the modified values.

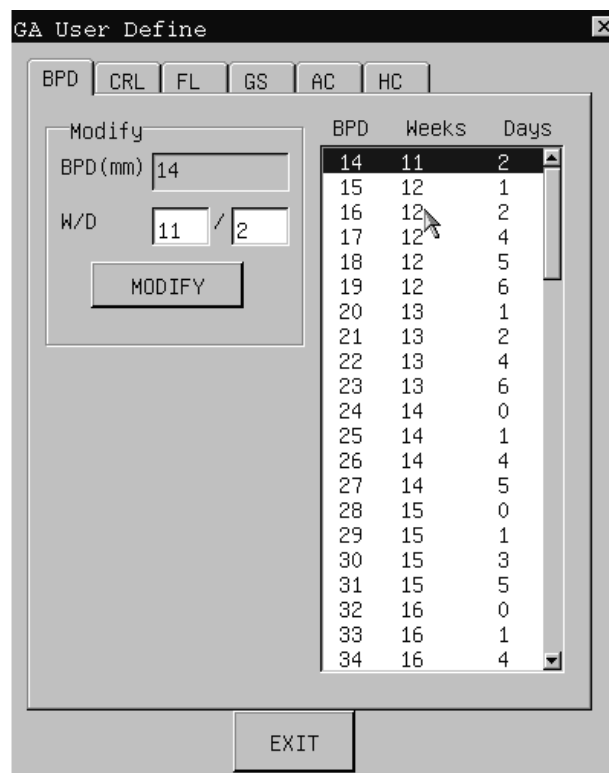


Fig 13-6 Editing interface of GA User Define



**Caution:** [Formula] page is only available in the dialog box of presetting OB/GYN examination mode.

### 13.3.4 Preset of IP

[IP] page is used to set a set of IP parameters including Dynamic range, Edge enhancement, Smoothness and Frame averaging. Move the cursor to “IP” button and press **【SET】** key to open the preset page of IP parameters as follows:

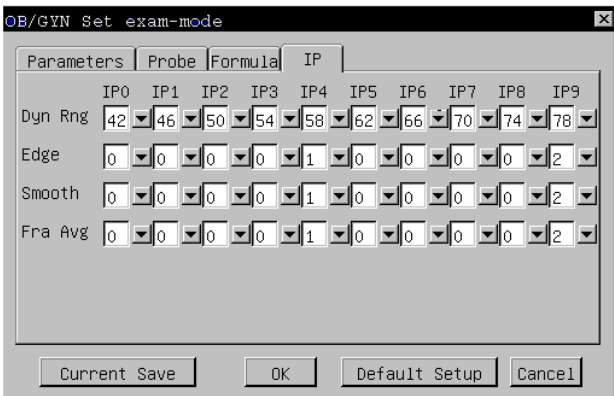


Fig 13-7 Dialog box for IP setting of OB/GYN exam mode

The items on [IP] page are described as below:

List 13-5   Preset parameters on IP page

Function Name	Setting method	Function description
Dynamic range	30~90	Set dynamic range, totally 16 levels
Edge enhancement	0~3	Set image edge enhancement
Smoothness	0~3	Set image smoothness processing
Frame Averaging	0~7	Set frame averaging

13.4   Preset of post processing

Preset of post processing is used for setup of parameters and curves of image post processing. On the dialog box-“B Post Proc Set”, gray transformation curve, gray rejection curve, and γ correction can be set .

Operation procedure:

In B, B/B, B/M or 4B mode at real-time status, move the cursor to menu item-“B POST PROCESS” in [PRESET ] menu and press 【SET】 to select it. The dialog box of post-processing setting appears as below:

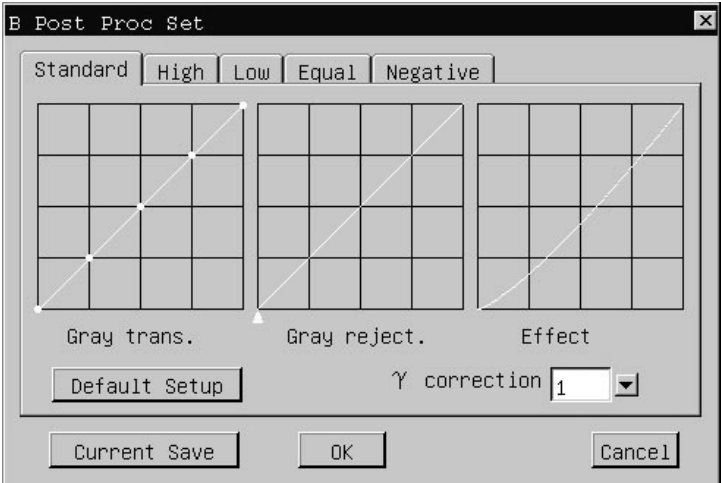


Fig 13-8 Dialog frame for preset post process

There are 5 pages on the dialog box for setting post- processing parameters: standard, high level, low level, equal level, negative. The items and operation on each page are the same.




**Note:** The function of the following button shown on the dialog box of B post processing preset:

1. “Default Setup” is used for recalling the default setting of Gray transformation curve and Gray rejection curve on the current page (e.g.[Standard] page).
2. “Current Save” is used for saving the setting of Gray transformation curve and Gray rejection curve on the current page ([Standard], [High], [Low], [Equal] or [Negative]) temporarily. When you need to set Gray transformation curve and Gray rejection curve on the different pages, you may set them on one page (e.g. [Standard]) first, move the cursor to “Current Save” button at left side of the bottom of this page to save the change temporarily, then select another page (e.g. [High] ) and set the parameter values.

**Take [Standard] page for example:**

### 13.4.1 Gray transformation curve


There are 5 round adjustment points on the gray scale transformation curve, which can be used to adjust the shape of the curve.  
Adjustment method:

1. Move the cursor onto one node position on the curve , the cursor will be displayed as “”, press **【SET】** key and move the trackball to adjust the curve. During the adjustment, the effect curve on the right side of the dialog box will change accordingly. Press **【SET】** key again to finish the adjustment on this point. Use the same way to adjust other points on the curve.
2. To confirm the above adjustment, move the cursor to “Current Save” button and press **【SET】**key. If you move the cursor to “Default Setup” button and press **【SET】** key, the system will discard the above adjustment and recall the default gray scale transformation curve which is shown as a beeline with 45° angel.
3. Move the cursor to “OK” button and press **【SET】**key to save the modification. If you move the cursor to “Cancel” button or **「×」** button on top right corner and press **【SET】** key, it will give up modification and close the dialog box.

### 13.4.2 Gray rejection curve

There is a trigon point (apex of the curve) used for adjusting gray scale rejection curve.

Adjustment method:

1. Move the cursor to the trigon point (apex of the gray scale rejection curve), and the cursor becomes “”. Press **【SET】** key and use trackball to move the adjustment point to adjust the curve. During the adjustment, the effect curve on the right side of the dialog box will change accordingly. Press **【SET】** key again to finish the adjustment of the curve.
2. To confirm the above adjustment, move the cursor to “Current Save” button and press **【SET】**key. If you move the cursor to “Default Setup” button and press **【SET】** key, the system will discard the above adjustment and recall the default gray scale transformation curve which is shown as a beeline with 45° angel.
3. Move the cursor to “OK” button and press **【SET】**key to save the modification. If you move the cursor to “Cancel” button or **「×」** button on top right corner and press **【SET】** key, it will give up modification and close the dialog box.

### 13.4.3 $\gamma$ correction

The parameter values for  $\gamma$  correction are divided into 4 steps: 0, 1, 2, 3, which respectively represents  $\gamma$  coefficient 1.0, 1.1, 1.2, 1.3.

Adjustment method:

1. Select the corresponding parameter value in the frame beside column-“ $\gamma$  correction”, and press **【SET】** key to confirm. Then the effect curve on the right side of the dialog box will change accordingly.
2. To confirm the above adjustment, move the cursor to “Current Save” button and press **【SET】** key.
3. Move the cursor to “OK” button and press **【SET】** key to save above setting of  $\gamma$  correction.. If you move the cursor to “Cancel” button or **【×】** button on top right corner and press **【SET】** key, it will give up the setting and close the dialog box.

## 13.5 Set annotation database

Classification of the preset annotation database: Abdomen, OB, GYN, Cardiac, Small parts and Pathological change. Each category has saved many in-built annotation terms before delivery. Users can add or delete user-defined annotation term by setting annotation database.

Move the cursor to menu item-“COMMENT” in [PRESET] menu and press **【SET】** key. A dialog box for setting annotation database appears as Fig 13-9:

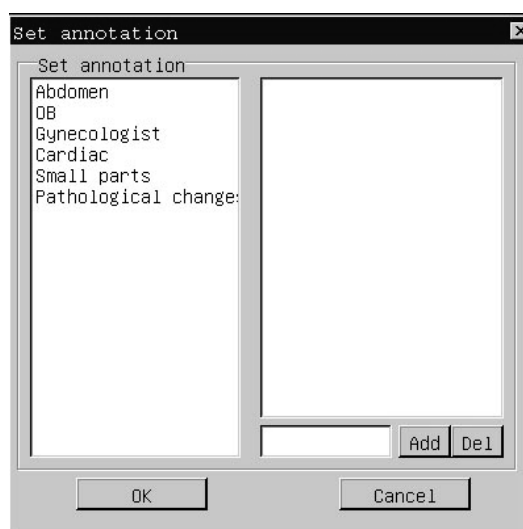


Fig 13-9 Dialog box for annotation setting

Add or delete user-defined annotation term in annotation database:

#### Add annotation term:

1. Select one of 5 categories in the left side frame, then all the annotation phrases for the selected category will be displayed.
2. Move the cursor to the lower right small frame beside “Add/Del” button, press **【SET】** key, and the cursor changes as flickering mark “|”, input a new annotation phrase through the keyboard.
3. After the input is finished, move the cursor to “Add” button and press **【SET】** key to confirm adding of the new phrase.
4. Move the cursor to “OK” and press **【SET】** key to store the modification. If you move the cursor to “Cancel” button or **【×】** button at top right corner and press **【SET】** key, it will give up adding of the new phrase and close the dialog at the

same time.

#### Delete annotation term:

1. Select one of 5 categories in the left side frame, then all the annotation phrases for the selected category will be displayed.
2. Select one phrase to be deleted in the right frame and this phrase will be highlighted.
3. Move the cursor to “Del” button and press 【SET】 key to confirm deleting of the selected phrase.
4. Move the cursor to “OK” and press 【SET】key to store the modification. If you move the cursor to “Cancel” button or [×] button at top right corner and press 【SET】 key, it will give up deleting of the new phrase and close the dialog at the same time.

## 13.6 Upgrade

#### How to check software version:

Press 【CTRL】 key + 【V】 key, the dialog box showing software version will appear on the screen.

#### How to upgrade software:

There are two methods to upgrade the software.

Method 1: Upgrade the software through PRESET menu

1. Copy the new version software under the root directory on a USB memory disk. **Please make sure the USB memory disk only contain the software folder without any other files. The software fold name should be upgrade and this folder should not be compressed. The upgrade folder should be located in the root directory of the USB memory disk.**
2. Switch off the ultrasound system
3. Wait for a moment and switch on the system
4. Connect USB memory disk with a new software version to the ultrasound system through USB port on its back panel
5. Select PRESET item on image menu and PRESET submenu appears
6. Move the cursor to UPGRADE item and press 【SET】 key to confirm software upgrade
7. The system will upgrade the software automatically.
8. After the software upgrade is finished, please take off USB memory disk from the system first. Then move the cursor to “OK” button on the dialog box and press 【SET】 key. The system will reboot automatically.
9. After the system is reboot, the user needs to input the Serial No. of the ultrasound system before any operation.

Method 2: Upgrade the software before system booting

1. Copy the new version software under the root directory of USB memory disk. **Please make sure the USB memory disk only contain the software folder without any other files. The software fold name should be upgrade and the folder should not be compressed. The upgrade folder should be located in the root directory of the USB memory disk.**
2. Switch off the ultrasound system
3. Connect USB memory disk with a new software version to the ultrasound system through USB port on the rear panel
4. Wait for a moment and switch on the system
5. The updating dialog box will appear on the screen. Move the cursor to “OK” then system will upgrade the software automatically.
6. After the software upgrade is finished, take off USB memory disk from the system first. Then move the cursor to “OK” button on the dialog box and press 【SET】 key. The system will reboot automatically.
7. After system reboot, the user need to input the Serial number of the ultrasound system before any operation.



**Note:**

1. The file format of USB memory disk should be FAT 32, otherwise, please format it as FAT 32 in Windows operation system.
2. Please make sure USB memory disk only contains the software folder upgrade. The new version software “upgrade” should be saved as a folder under root directory of USB memory disk and this fold is not compressed.
3. Please upgrade the software directly after the system is switched on.

**Caution:**

1. During software upgrading, the power supply of ultrasound machine can't be stopped. Otherwise, it will damage the system.
2. USB memory disk can't be pulled out during software upgrade (During working status, the indicator on the USB memory disk is flickering).

## Chapter14 Reports

### 14.1 Brief Introduction

Reports function is used to store and recall the patient's examination report, allow doctors to read and manage the patients information..

Report templates include the normal examination report, OB examination diagnosis report, cardiac examination diagnosis report and Reproduction examination diagnosis report.

To enter into report function, please press **【REPORT】** key, then [REPORT] menu appears, select the needed examination report menu item, press **【SET】** key to enter into report editing mode.



**Note:**

If **Abdomen** exam mode is selected for examination, **Normal exam report** and **Cardiac exam report** are available when you press **【REPORT】** key.

If **OB** exam mode is selected for examination, **OB exam report** is available when you press **【REPORT】** key.

If **Reproduction** exam mode is selected for examination, **Reproduction exam report** is available when you press **【REPORT】** key.

If **Small parts** exam mode or **User-defined** exam mode is selected for examination, **Normal exam report** is available when you press **【REPORT】** key.

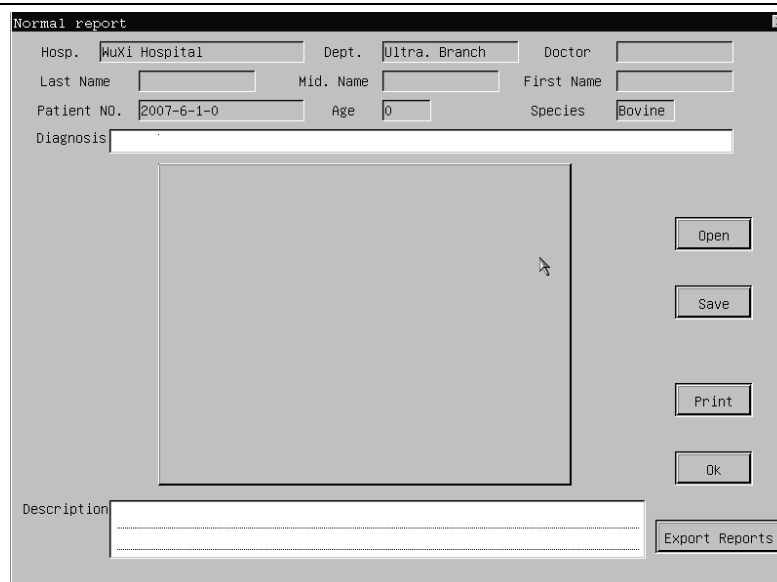
### 14.2 Report interface

Take the normal examination report as an example to explain how to use report function:

The normal examination report interface is shown as follows. Report interface includes hospital name, department name, and basic patient information, the doctor can make description of patient status in it according to the clinical diagnosis and ultrasound images. To exit current report interface, please press **【SET】** key on "OK" button or **「×」** button at top right corner of the dialog box.



**Note:** Toggle-switch key can be used to fast locate the cursor (same as TAB key's function in Windows) when making comments in the report page



The interface is titled "Normal report". It contains several input fields: "Hosp." (MuXi Hospital), "Dept." (Ultra. Branch), "Doctor" (empty), "Last Name" (empty), "Mid. Name" (empty), "First Name" (empty), "Patient NO." (2007-6-1-0), "Age" (0), "Species" (Bovine), and "Diagnosis" (empty). Below these is a large empty rectangular frame for an image. To the right of the frame are buttons: "Open", "Save", "Print", "Ok", and "Export Reports". At the bottom left is a "Description" label and a text input field.

Fig. 14-1 Normal examination report interface

### 14.3 Input, delete and preview

Take the normal examination report as an example:

1. There is one frame for image input in the center of the report page (see above Fig. 14-2), press **【SET】** key on the frame to select it,
2. A dialog box 'open file' appears, move the cursor onto the needed image file (bmp or jpg file) and press **【SET】** to select it, press "Open" button on the dialog box to input the selected image.

If the user wants to delete the image from the report file, please select the image first (if 4 images are input in the report, please press **【ABDOMEN】** exam mode key to select the 1st image, or press **【OB/GYN】** exam mode key to select the 2nd image, or press **【SMALL】** exam mode key to select the 3rd image, or press **【REPRO.】** exam mode key to select the 4th image), then press **【CLR】** key to delete the selected image.

3. Move the cursor onto the frame of report interface and press **【CANCEL】** key for image preview. To exit image preview window, please press **【SET】** key. If the selected image is not for diagnosis of the patient, please repeat the steps from 1 to 3 to input the needed image.

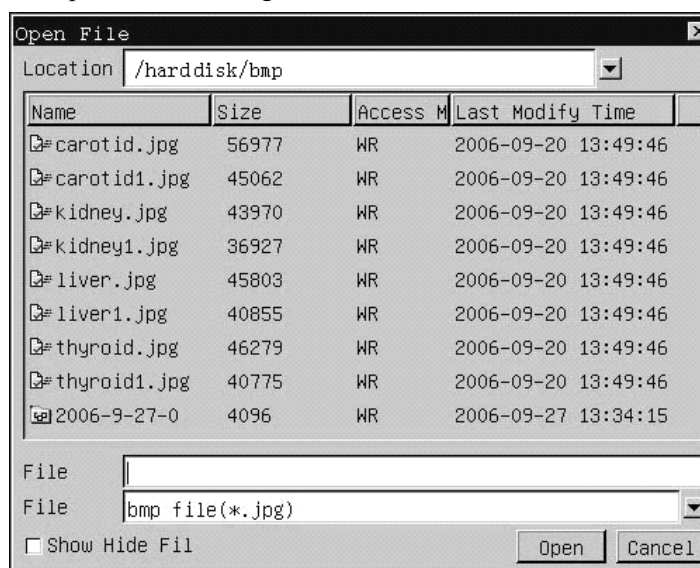


Fig. 14-2 The dialog box of open image



**Note:**

1. If there is no USB memory disk connected to the system, the system will recall the images saved as jpg format in the

system for image input.

2. When USB memory disk is connected to the system, the system will recall the images saved as bmp or jpg format in the USB memory disk directly for image input.
3. If users want to input the images saved in the system directly, please make sure no external USB memory disk is connected to the system.

## 14.4 Save and recall report file

Users can use report function to save a report and recall the saved report.

### How to save a report:

1. Press **【REPORT】** key to enter into report function, the **【REPORT】** key will get back-lit and [REPORT] menu appears. Select the needed report template, the report interface appears, add the diagnosis comment and input the image. Move the cursor to “Save” button and press **【SET】** key.
2. A dialog box-‘Save File’ appears, input report file name, move the cursor to “Save” button and press **【SET】** key to finish the operation of saving the report.
3. To exit current report interface, please press **【SET】** key on “OK” button or **「×」** button at top right corner of the dialog box.
4. Press **【REPORT】** key to exit from report function, the **【REPORT】** key will get dark.

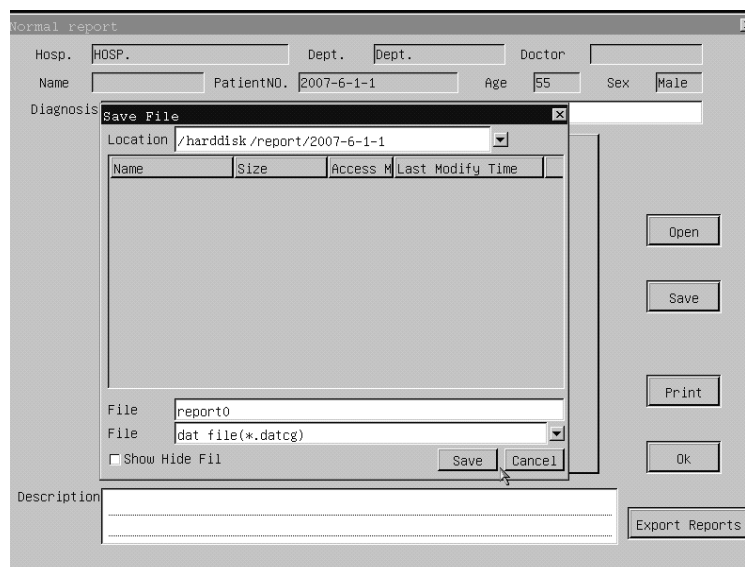


Fig 14-3 Dialog box - save a report



- Note: 1. If there is no USB memory disk connected to the system, the report will be saved in the system under the default directory: **/harddisk/report/current patient ID**.
2. To save the memory space for the system, when there is USB memory disk connected to the system, the report will be saved in the connected USB memory disk under the default directory: **/udisk/report/current patient ID**.

### How to recall the saved report:

1. Press **【REPORT】** key to enter into report function, the **【REPORT】** key will get back- lit and [REPORT] menu appears. Select the needed report template, the report interface appears, move the cursor to “Open” button and press **【SET】** key .
2. A dialog box-‘Open File’ appears, move the cursor onto the needed report file and press **【SET】** to select it, press “Open” button on the dialog box to recall the selected report..
3. To exit current report interface, please press **【SET】** key on “OK” button or 「×」 button at top right corner of the dialog box.
4. Press **【REPORT】** key to exit from report function, the **【REPORT】** key will get dark.



- Note:**
1. If there is no USB memory disk connected to the system, it will open the report file saved in the system.
  2. If there is USB memory disk connected to the system, it will open the report file saved in the connected USB memory disk.
  3. The saved report file should be recalled in the ultrasound system.

## Chapter 15 System Maintenance

### 15.1 Cleaning



**Caution:** Before clean any part of the system, please make sure that the system is turned off and the power cord is disconnected from the power supply socket. Otherwise there will be danger of electricity shock.

Cleaning method of the keyboard, outer-frame, probe holder and monitor:

Please use a piece of soft and dry cloth to clean the system. If there's some dirty difficult to be cleaned, please use wet cloth to clean system, and then use dry cloth to wipe off the water on the system.



**Caution:**

1. Please don't use organic solvent to clean the probe, otherwise it will destroy the probe surface.
2. Please never allow any liquid get inside the system or probe, otherwise it will destroy the system and cause electronic shock.
3. If the probe connector, STC slide or any peripheral device need to be cleaned, please contact our authorized agent in your country in advance. Any cleaning by unauthorized person may result in system malfunction or affect its features.

### 15.2 Probe maintenance

According to the purposes, the probes of this system can be divided into 2 categories: those used on the surface of patient body, or those used inside the body of patient.

**Alarm:** No matter which type of examination, please always try to reduce the unnecessary radiation of ultrasound wave to the patient during the ultrasound examination



**Caution:**

- (1) Probe can only be used by professional doctor who has received professional training of ultrasound.
- (2) It is forbidden to sterilize and disinfect probe by high pressure. If it needs to be used in sterilized occasion, please use a sterilized disposable probe cover on the probe.
- (3) Please avoid drop off of the probe or hitting the probe by anything.
- (4) Don't scratch the probe surface while using it.
- (5) Please use the authorized ultrasound gel during scan. Using un-authorized gel may cause

scratch or damage to probe surface.

- (6) Don't bend or pull the probe cable with force..
- (7) Please don't put the probe connector and its adjacent probe cable part into any liquid.
- (8) Please keep the probe clean and dry.
- (9) Please connect or disconnect the probe only after the system is turned off.
- (10) Please don't use or preserve the probe where it is over 50°C.
- (11) Please carefully check the probe surface, probe cable and probe connector before each operation. If there is any abnormal phenomenon (eg. there's a leakage on the probe surface), please stop using the probe immediately and contact our authorized agent in your country as soon as possible. If you don't know the contact number of your authorized agent, please contact us by detail contact information at the end of this chapter.

## Probe maintenance

15.2.1 Please take good care of the probe. Collision and dropping is strongly prohibited.

15.2.2 Please use the ultrasound gel which is acknowledged by the manufacture of the unit. We recommend AQUASONIC Gel made by R. P. Kincheloe Company in USA.

15.2.3 Plug and unplug of probe in real-time is strongly prohibited.

15.2.4 Bending and pulling the probe or the probe cable by strength is prohibited.

15.2.5 Wash the probe:

1) Probe tip

Rinsing.....Rinse the surface with running water, and use a sponge or soft cloth to remove gently the dirt and gel on probe tip

2) Connector, Cable, other part of the probe tip must not be soaked in a solution. Simply clean it by using a soft cloth moistened with alcohol and then dry it.

15.2.6 Disinfection: When necessary, soaking the probe tip in disinfection solution. The

recommended disinfection solution is CIDEX ACTIVATED DIALDEHYDE SOLUTION.

(Manufacturer: Johnson and Johnson Medical) . It has been approved by the FDA , its 510(K) number is K924434.. The following instructions are provided by Johnson and Johnson Medical . For more detail, please contact Johnson and Johnson Medical

1) Soaking temperature: 10°C~40°C

2) Atmospheric pressure: 700hPa~ 1060hPa

3) Soaking time: Under FDA requirements, CIDEX Activated Dialdehyde Solution requires

45 minutes processing at 25°C for high level disinfection. The 45 minutes processing time was established as the time to kill 6 logs of the test organism.

15.2.7 Rinsing: Sufficiently rinse the probe by using water to remove chemicals.

15.2.8 Aeration and let the probe become dry in normal temperature.

15.2.9 Please strictly keep the probe away from the paint thinner, ethylene oxide, other organic solvent, etc

15.2.10 Please keep the probe inside the probe case when it is not in use.

15.2.11 Dipping the probe or the cable into any liquid is strongly prohibited.



**Warning: Please immediately stop using the probe and system if there is any broken phenomenon on the electricity cable or the probe transducer. Otherwise there will be a danger of the electricity shock.**

### 15.3 Safety check

To ensure the system work normally, please make a maintenance plan, check the safety of the system periodically. If there is any abnormal phenomenon with the machine, please contact our authorized agent in your country as soon as possible.

If there is no image or menu on the screen or other phenomenon appears after switching on the machine, please do troubleshooting first according to the following check list. If the trouble is still not solved, please contact our authorized agent in your country as soon as possible.



## 15.4 Troubleshooting

According to the most frequently occurred errors and system messages, the list of possible causes and relevant solutions is attached as below:

Errors & Messages	Possible Cause	Solution
When turn on the system, power-indicating lamp is not lit.	1) AC power supply may not work normally. 2) Power cord may not be connected, or may not be well connected to the power supply socket.	1) Check the AC power supply to make sure it is normal. 2) Check the power cord connection to make sure it's good.
When turn on the system, power indicating lamp is lit, but no images on the monitor..	1) The system is restarted too shortly after it is switched off. 2) The brightness and contrast of monitor is improperly adjusted.	1) Wait for 1 minute to restart the system after switching off. 2) Appropriately re-adjust brightness and contrast of monitor.
Menu bar displays on the screen but no scanning image	1. Transmission frequency, gain or STC control is not set properly. 2. No probe is connected or probe is connected improperly 3. the system is in frozen status	1. Adjust the transmission frequency, gain or STC control. 2. Ensure the probe is connect correctly 3. Defreeze the system by pressing the FREEZE key.
Image quality is abnormal	1. Exam mode is not correct 2. Image processing parameters are set improperly	1. Set the exam mode correctly. 2. Adjust the setting of image processing or set it to default setting
Wrong probe type show on screen.	The probe is not connected well with probe connector.	Reconnect probe correctly. (Please refer to Chapter 3, Section 3.5.3)

If you have any questions, please contact with our service department.

Company name: CHISON Medical Imaging Co., Ltd.

Service department

Tel: 0086-510-85311707, 85310593

Fax: 0086-510-85310726

E-mail: service@chison.com.cn

Add: NO.8, XIANG NAN ROAD, SHUO FANG, NEW DISTRICT, WUXI, CHINA 214142

WELCOME TO VISIT US AT [HTTP://WWW.CHISON.COM.CN](http://www.chison.com.cn)

**REF: V1.05-20101009-VET**


**Guidance and manufacture's declaration – electromagnetic emissions-  
for all EQUIPMENT and SYSTEMS**

<b>Guidance and manufacture's declaration – electromagnetic emission</b>		
The 8300VET Digital Ultrasound System is intended for use in the electromagnetic environment specified below. The customer of the user of the 8300VET Digital Ultrasound System should assure that it is used in such and environment.		
<b>Emission test</b>	<b>Compliance</b>	<b>Electromagnetic environment – guidance</b>
RF emissions CISPR 11	Group 1	The 8300VET Digital Ultrasound System uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emission CISPR 11	Class A	The 8300VET Digital Ultrasound System is suitable for use in all establishments other than domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Complies	

**Guidance and manufacture's declaration – electromagnetic immunity –  
for all EQUIPMENT and SYSTEMS**

<b>Guidance and manufacture's declaration – electromagnetic immunity</b>			
The 8300VET Digital Ultrasound System is intended for use in the electromagnetic environment specified below. The customer or the user of 8300VET Digital Ultrasound System should assure that it is used in such an environment.			
<b>Immunity test</b>	<b>IEC 60601 test level</b>	<b>Compliance level</b>	<b>Electromagnetic environment - guidance</b>
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete or ceramic tile. If floor are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines	±2kV for power supply lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV differential mode ±2 kV common mode	±1 kV differential mode ±2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5% $U_T$ (>95% dip in $U_T$ ) for 0.5 cycle  40% $U_T$ (60% dip in $U_T$ ) for 5 cycles  70% $U_T$ (30% dip in $U_T$ ) for 25 cycles  <5% $U_T$ (>95% dip in $U_T$ ) for 5 sec	<5% $U_T$ (>95% dip in $U_T$ ) for 0.5 cycle  40% $U_T$ (60% dip in $U_T$ ) for 5 cycles  70% $U_T$ (30% dip in $U_T$ ) for 25 cycles  <5% $U_T$ (>95% dip in $U_T$ ) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the 8300VET Digital Ultrasound System requires continued operation during power mains interruptions, it is recommended that the 8300VET Digital Ultrasound System be powered from an uninterruptible power supply or a battery.
Power frequency (50/60Hz) magnetic field IEC61000-4-8	3A/m	3A/m	Power frequency magnetic fields Should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE $U_T$ is the a.c. mains voltage prior to application of the test level.			

**Guidance and manufacture's declaration – electromagnetic immunity –  
for EQUIPMENT and SYSTEMS that are not LIFE-SUPPORTING**

<b>Guidance and manufacture's declaration – electromagnetic immunity</b>			
The 8300VET Digital Ultrasound System is intended for use in the electromagnetic environment specified below. The customer or the user of 8300VET Digital Ultrasound System should assure that it is used in such an environment.			
<b>Immunity test</b>	<b>IEC 60601 test level</b>	<b>Compliance level</b>	<b>Electromagnetic environment - guidance</b>
<p>Conducted RF IEC 61000-4-6</p> <p>Radiated RF IEC 61000-4-3</p>	<p>3 V<sub>rms</sub> 150 kHz to 80 MHz</p> <p>3 V/m 80 MHz to 2.5 GHz</p>	<p>1 V<sub>rms</sub></p> <p>3 V/m</p>	<p>Portable and mobile RF communications equipment should be used no closer to any part of the 8300VET Digital Ultrasound System, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.</p> <p><b>Recommended separation distance</b></p> $d = \left[ \frac{3.5}{V_1} \right] \sqrt{P}$ $d = \left[ \frac{3.5}{E_1} \right] \sqrt{P} \quad 80 \text{ MHz to } 800 \text{ MHz}$ $d = \left[ \frac{7}{E_1} \right] \sqrt{P} \quad 800 \text{ MHz to } 2.5 \text{ GHz}$ <p>Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m).</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,<sup>a</sup> should be less than the compliance level in each frequency range.<sup>b</sup></p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 
<p>NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.</p> <p>NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.</p>			
<p><sup>a</sup> Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the 8300VET Digital Ultrasound System is used exceeds the applicable RF compliance level above, the 8300VET Digital Ultrasound System should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the 8300VET Digital Ultrasound System.</p> <p><sup>b</sup> Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 1 V/m.</p>			

**Recommended separation distances between portable and mobile  
RF communications equipment and the EQUIPMENT or SYSTEM –  
for EQUIPMENT or SYSTEM that are not LIFE-SUPPORTING**

<b>Recommended separation distances between portable and mobile RF communications equipment and the 8300VET Digital Ultrasound System</b>			
The 8300VET Digital Ultrasound System is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the 8300VET Digital Ultrasound System can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the 8300VET Digital Ultrasound System as recommended below, according to the maximum output power of the communications equipment.			
<b>Rated maximum output power of transmitter (W)</b>	<b>Separation distance according to frequency of transmitter (m)</b>		
	<b>150 kHz to 80 MHz</b> $d = \left[ \frac{3.5}{V_1} \right] \sqrt{P}$	<b>80 MHz to 800 MHz</b> $d = \left[ \frac{3.5}{E_1} \right] \sqrt{P}$	<b>800 MHz to 2.5 GHz</b> $d = \left[ \frac{7}{E_1} \right] \sqrt{P}$
0.01	<b>0.35</b>	<b>0.12</b>	<b>0.23</b>
0.1	<b>1.11</b>	<b>0.37</b>	<b>0.74</b>
1	<b>3.50</b>	<b>1.17</b>	<b>2.33</b>
10	<b>11.07</b>	<b>3.69</b>	<b>7.38</b>
100	<b>35.00</b>	<b>11.67</b>	<b>23.33</b>
For transmitters rated at a maximum output power not listed above, the recommended separation distance d in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.			
NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.			
NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			